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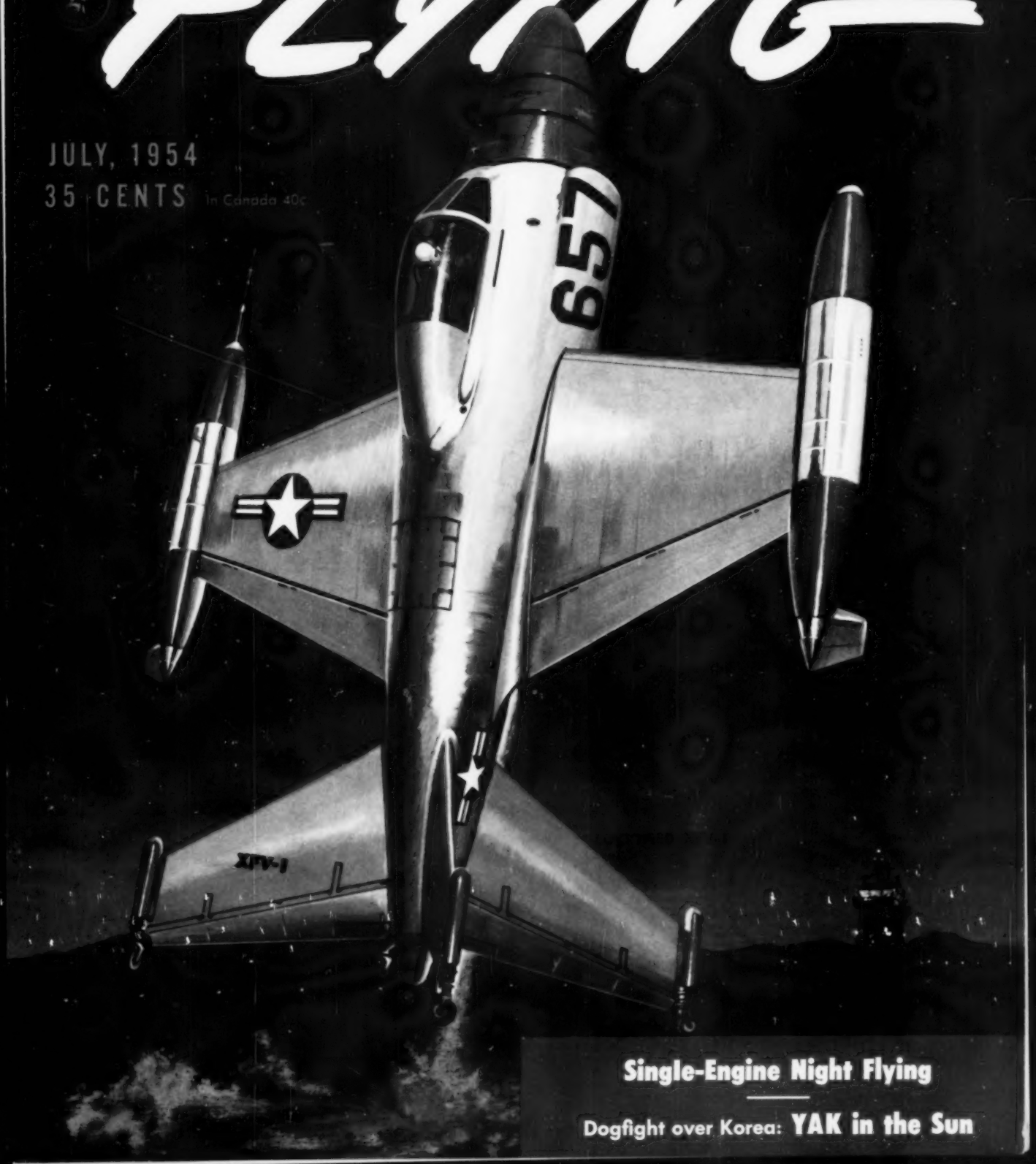

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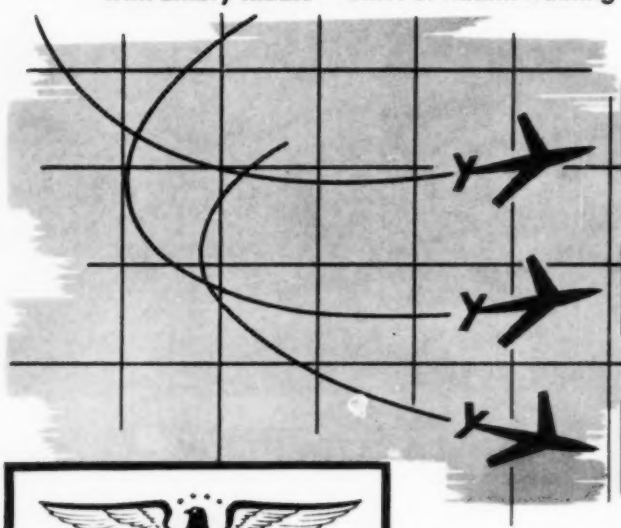

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FLYING

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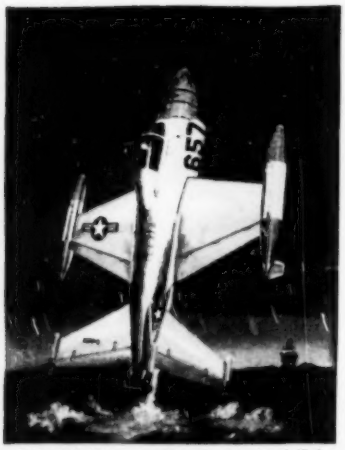

THE COVER: Lockheed's Vertical Take-off Fighter. Painting by Ed Valigursky.

CONTENTS

Less Surprise Weather, *An Editorial* 12
Pogo Pilot . . . . . *J. F. "Skeets" Coleman* 14
The Next Step in Navigation . . . . . *Owen S. Olds* 16
Yak in the Sun . . . . . *Maj. Robert D. Thresher, USAF* 18
"Sunset's" Heliport . . . . . *T. H. Allison* 20
Grandaddy of Jets . . . . . *Joseph Bonanno* 22
Genealogy of American Aircraft: RYAN . . . . . *Gill Robb Wilson* 23
The Rebirth of German Aviation . . . . . *S. G. Joseph* 26
A New Look at Single Engine Night Flying . *Jesse W. Stonecipher* 28
Cornered . . . . . *Weyman S. Carver* 30
Man with a Hammer . . . . . *Frank Harvey* 31
The Distaff Side . . . . . *Dick LaCoste* 32
Letter to a Fledgling . . . . . *Ralph Korngold* 34
Loading Your Airplane . . . . . *Lorraine Rosser* 38
I Learned about Flying from That! No. 173 . . . . . *Hugh C. Nichols, Jr.* 39

FLYING FEATURES

Mail Box 8
Have You Seen? 36
AOPA News 40
Briefings 41
Flying Farmers . . . *Bill Renshaw* 54

Photo Credits 64
Index of Advertisers 65

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Chief Pilot Bacastow at the controls of a Douglas DC-3. The ship is one of a fleet of four operated by the F. C. Russell Company, world's largest manufacturer of combination screen and storm sash.

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Lockheed

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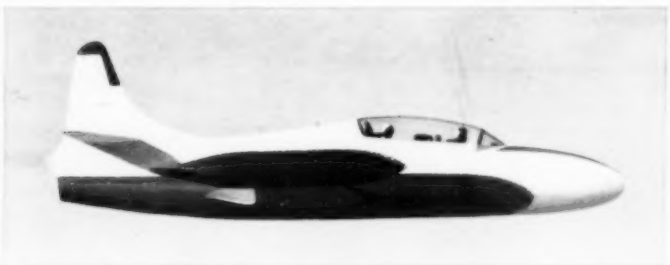

WORLD'S SAFEST JET AIRPLANE. Greater power, larger cockpit, but, above all, more safety have been engineered by Lockheed into its new jet trainer. New stall slats, drag chute, Zero Reader and pilot "stick shaker" device to automatically warn about possible stall are just a few of added safety features. Trainer combines jet combat performance with maximum operational safety. Easier to fly than simple propeller-driven trainers.

GUIDED MISSILE and pilotless aircraft research is advancing rapidly at Lockheed. Here engineer-scientists from the Missile Systems Division test top-secret developments to meet problem of supersonic speeds yet unattained.

Scientists Unveil Radical Forms of Flight

High-Speed Navy Fighter Takes Off Straight Up, Lands by Backing Straight Down on Its Tail

Today's biggest news in aviation is the Navy's XFV-1 built by Lockheed, a revolutionary new vertical-rising plane.

A powerful Allison turbo-prop engine with two jet turbines turning counter-rotating propellers lifts XFV-1 straight up, rocket fashion. It levels off for speeds in the 500-m.p.h. class, lands on its tail.

Many Lockheed "firsts" are built into this airplane. A ¼-scale model powered by a 76-h.p. electric motor was built and flown to test vertical ascent, transition into level flight, and landing. Careful weight control permitted completion of first prototype hundreds of pounds less than estimated weight for Navy requirements.

Unique 4-way tail serves as a single surface and jointly functions as elevator, aileron and rudder, using revolutionary interlocking controls.

SOUND ENGINEERING pays off with Lockheed P2V Navy patrol bomber. The famous Neptune has increased gross takeoff weight and boosted speed by adding powerful jet pods. Neptune's aerodynamic configuration, however, remains unchanged from original X model 11 years ago through the current 7 series.

FIRST ROUND-THE-CLOCK flying radar station in the world is this Lockheed Early Warning Aircraft (designated WV-2 by Navy and RC-121C by Air Force). Huge 600-gallon tip-tanks extend radar-laden Super Constellation's range. Plane carries more scientific equipment than any other known aircraft—some six tons of electronics. Bottom radome, the size of a swimming pool, is largest plastic part ever built. Although it is held to plane by only 10 bolts (no metal ribs), radome is built to withstand aerodynamic pull of up to 60,000 pounds. Super Constellation's three-tail design insures aircraft controllability despite air-flow disturbance created by protruding radomes.

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MAIL BOX

IN THE RIGHT DIRECTION

There is at least one Air Explorer Squadron really on the job (in answer to Mr. Roosa in the Feb. Mailbox). I belong to Squadron 3 of North Hollywood. We own our own J-3 *Cub* and have the use of an Ercoupe. These are used for training, and four of the boys

have soloed. The adults are our instructors so the only expense is the cost of fuel and oil. Besides learning to fly, we go on air trips lasting for several days. A number of the adults in the Squadron own 4-place Stinsons which are used on such flights

JIM UPTON

San Fernando, Calif.

HOW TO BUY AN AIRPLANE

In reading your magazine over the past months, I've only come across one good article that would help a beginner in buying an airplane. It was called: "Extending the Life of Your Fabric."

My wife and I are both learning to fly and would like to buy our own plane but know nothing about the different types and what to look for—and still get our money's worth. We were wondering why you didn't run a series for beginners on How to Buy an Airplane.

BOB CRAWFORD

Lynwood, Calif.

● *That's an excellent idea and we'll see what can be done about it. In the meantime, perhaps the article "Letter to a Fledgling" in this issue will be helpful.*—ED.

WISCONSIN AIR PAGEANT

I was quite pleased to read the letter in the March issue about the Wisconsin Air Pageant.

In my travels all over the United States as "The Flying Signpainter," I have seen a lot of air shows, but must say these boys really put on a production! It gets bigger and better every year. Their show *sells* private and business flying and is a great booster for the industry.

I would also like to add that Gran-Aire, Inc., operators at Curtiss-Wright Airport in Milwaukee where the show is held, are among the top for service, courtesy and running an airport that is really on the ball.

BOB ALLEN

Pratt, Kans.

SKY MANOR

In regard to the article on Sky Manor which appeared in the April issue of FLYING, there has been some question in the minds of a number of readers as to what facilities are open to the public. We would like to point out that the restaurant and hotel accommodations are open to all. Those staying at the hotel become guests of the club and as such are privileged to use the recreational facilities.

ROBERT R. THEISZ

Pittstown, N. J.

ONE FOR ALL

Congratulations on a well-balanced aviation publication. Especially the March issue. It provides information; food for thought for beginners and enthusiasts of aviation; review for rusty ex-military pilots whose family, financial and occupational obligations prevent the desired minimum flying for proficiency and pleasure; and for press, educational and civic leaders it gives a clear picture of what is going on in the air.

M. G. RIGHETTI

San Louis Obispo, Calif.

THE PONTIUS PLANE

I was indeed impressed by the article by Rae V. Youngdale, "Old Ideas—New Genius," about the Pontius experimental biplane. Sincerely, I hope someone will produce Mr. Pontius' airplane and put it on the market in the less than $1,000 class or in kit form.

REGINALD GERWIG

Delaware, O.

THE PRO'S NEST

The Pro's Nest is the greatest and most economical achievement toward creating low cost instrument training yet devised. I wish it might be contained on one page —or more if necessary—and with perforations for easy removal for inserting in notebooks which pilots could use for reference.

BRUCE H. BENEDICT

FPO, N. Y.

● *Your suggestion is excellent and we would like to follow through but perforations are mechanically impossible in our printing process.*—ED.

Procedure for use of an ADF radio presented in your March issue seems to me rather tedious. The only case where a pilot should have to figure bearings would be when trying to approach a station on a predetermined course.

When homing on a station, a pilot need only bracket himself on the proper heading to correct for drift. Using a gyro compass if available, just turn to a heading where the station is directly ahead. Maintain that heading for a few moments and note how many degrees the relative bearing has changed. Correct that number of degrees and then turn several degrees more in the same direction as the correction. Follow the new heading for a while and repeat the correction with a smaller over-correction. This procedure should be necessary only at 15 to 20 minute intervals after initial corrections.

As an old navigator, I hate to see the pilots overloaded with unnecessary calculations. However, don't let me discourage you from printing new ideas.

WARREN T. LAY

Pacific, Wash.

KIWI SECTION?

I wish there was some place in AOPA for those of us who can't fly and still would like to wear some kind of AOPA wings. Some kind of non-active section is suggested with a membership fee not more than five dollars. Just being an AOPA helper, in other words. I only flew from 1945 to 1948, but the love of flight went deep. I was slow in learning for I have a bad right hand from early childhood polio. I joined AOPA in 1948 when I was doing a lot of soloing. Haven't been off the ground since Sept., 1952. Am proud of what everyone is doing for flying in both FLYING magazine and the AOPA.

PATSY BRUNSWICKER

Nogales, Ariz.

MEMORIES OF YO-DO

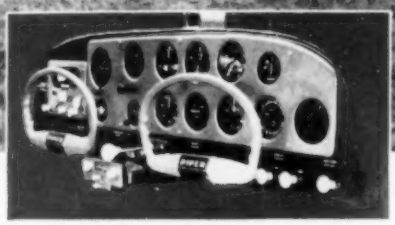
Congratulations to FLYING and Lt. Cmdr. Parsons on the fine article "Mayday YO-DO." Many more stories could be written about YO-DO, the other islands in Wonsan Harbor, and the many fine people—Koreans, British and Americans—who garrisoned those bits of sand and rock. I was an inhabitant myself for a while and witnessed several "Wonsan War Dances"—the evasive action taken by the U. S. DD's and DDE's when they received counter-battery fire from the mainland which almost completely surrounded them. This occurred every day for over 28 months.

The pictures were excellent and very recognizable. I lived in a tent that was approximately where the tents are, in the upper right of the picture of the helicopter landing strip.

The Leper colony on Tae-do, nearest island to Kalma-gak, is a story in itself. Several churches in the U. S. contrib-

(Continued on page 10)

Built to Go Places...



BUILT FOR CROSS-COUNTRY Fully-equipped Piper Super Custom costs less than most 4-place ships bare. Includes full gyro instrumentation, Omni, VHF transmitter, VHF/LF receiver, loop.

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Piper Tri-Pacer

One thing's for sure—when you fly the Tri-Pacer you fly with confidence for you know it's *built*, really well built, really well designed. Its bridge-like fuselage, welded of high quality aircraft steel and its wings made up of aluminum spars and ribs secured by four husky lift struts, assure you of a rugged lightweight compact structure.

And over all is the exclusive Piper Duraclad finish, the tough plastic surface that is resilient, non-flammable, sun and weather-resistant and lasts much longer than coverings previously used. Duraclad's smooth finish means added speed and easier cleaning; comes in a choice of attractive colors.

This type of construction provides maximum strength with minimum weight which explains why the Tri-Pacer carries such a hefty load. Just another reason why more people pick Piper Tri-Pacers than any other four-place plane.

See and fly the Tri-Pacer at your Piper dealers or SEND TODAY for handsome, full-color brochure on this great airplane. Dept. 7-G.

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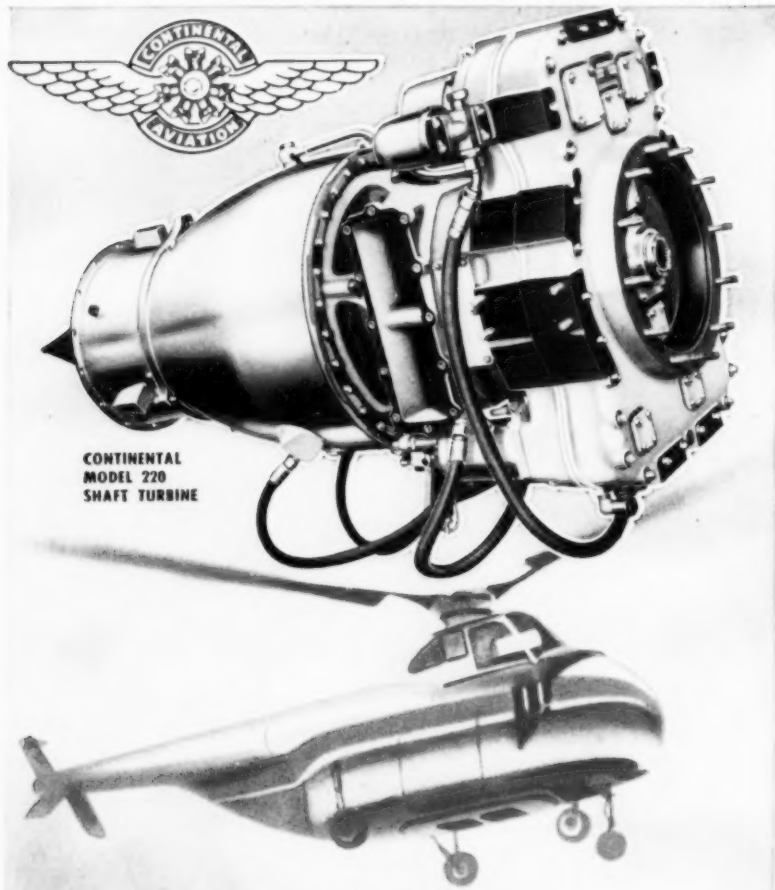

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Continental, a great name in power, offers advanced development and modern manufacture to serve those requiring turbine power plants for helicopters, fixed wing aircraft, or other applications. If you manufacture equipment with a present or a prospective use for turbines—shaft power, air generators or jets—discuss your engine problems with C.A.E.

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SUBSIDIARY OF CONTINENTAL MOTORS CORPORATION

MAIL BOX

(Continued from page 8)

uted clothing and food through the efforts of Lt. Jim Lampe, USN, and the Navy gave medicine. Lampe was in the Wonsan area before, during and after I visited there and was "Number One" to everyone who knew him.

JOHN N. BROWN

Ypsilanti, Mich.

BACK ISSUES NEEDED

I am rebuilding a Heath *Parasol* plane and need the several parts of an article by Ed Heath contained in old issues of *Popular Aviation*. Would appreciate hear-

ing from anyone who might have the following issues available:

Dec., 1930; Jan., Feb., Mar., Apr., May, June, 1931.

My Heath will be similar to the one owned by Mr. E. C. Seiler of Springfield, Mo. It is the same model and will have the same type engine.

CLOYD C. CANNON, JR.

Box 94
Winner, South Dakota

DOLLARS IN DIXIE AIR

Your article "Dollars in Dixie Air" seems to sum up Mr. Beverly Howard very well. I first had the pleasure of meeting him just before he toured Europe for acrobatic demonstrations. Having flown in from South Carolina to Washington, D. C., in the coldest of weather in an open cockpit plane, he was tired and hungry. In taking him downtown to his hotel, I made known to him my intention of becoming a fixed base operator. That started the ball rolling. For the next hour I received the best lecture of my life on the ups and downs of fixed base operations. In parting, his words were: "Good luck, stick with it and you can make it."

We haven't made it but we are sticking with it. Many thanks to Bevo for selling aviation up not down.

DUDLEY D. WATTS, Mgr.
Municipal Airport

Manassas, Va.

KIND WORDS

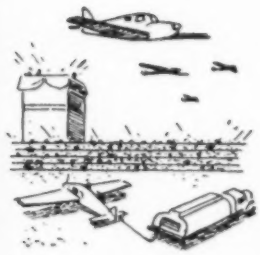
Would like to offer my appreciation for the increasing number of articles you have written about civilian flying. Hope we will have more of the same.

GEORGE H. BAKER

Daytona Beach, Fla.

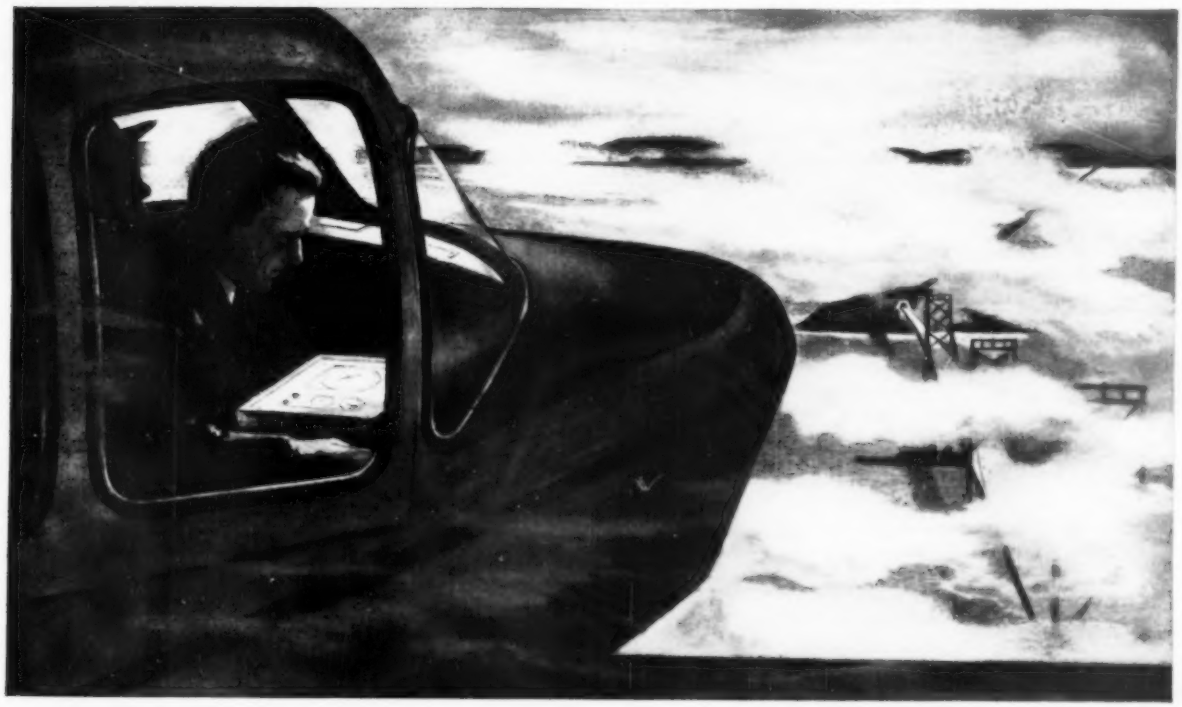
● *We will.*—ED.

PLANE FAX



Your Best Week-end Flight Plan for July

Fly to Long Beach, California, to watch the start of the Eighth Annual All-Women Transcontinental Air Race, July 3. You'll get quality Standard Aviation products and service at Long Beach Municipal Airport.



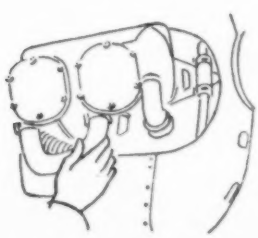
Sampling fog 500 feet over San Francisco Bay

Research takes to the air! University scientists rent a Navion from Jack Nystrom, manager of Palo Alto Airport, to flight-test "cloud-sampling" instruments above San Francisco Bay. The devices are used at 500-foot intervals, from 500 to 10,000 feet, to measure water content, impurities, and other properties of haze, fog and smog.

"Flying low over the Bay can be fun," says Ray Whitmore, Mr. Nystrom's chief pilot, "as long as I know my plane's in top condition. With RPM Aviation Oil in our engines, we have no trouble with valve sticking or rough running, and our engines never knock even during take-off or on fast climbs under heavy load."

"Whether we use our planes for smog sampling, forest patrols, or student training," says Mr. Nystrom, "we get ⅓ more flying time between overhauls with RPM Aviation Oil. It ends ring-sticking, reduces wear, and keeps our engines so clean that we save labor at overhaul. And because 'RPM' prevents pre-ignition and holds down cylinder head temperatures, we don't know what it is to have to replace pistons. They seem to stay in good condition indefinitely."

T. M'S "RPM," "CHEVRON," REG. U.S. PAT. OFF.



TIP OF THE MONTH

It's a good idea to check your engine's exhaust system for cracks or other leaks. They'll show a grayish lead deposit on the outside of the pipes.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA

FLYING
VOLUME 55, NO. 1
JULY, 1954

AN EDITORIAL

Less Surprise Weather

THE SAFETY, comfort and popularity of flying in the United States could be increased by greater emphasis of on-the-spot, en route weather reports by pilots.

Complaints of "surprise" weather not covered by forecast continue to be too numerous. In too many mishaps the weather is listed as a major contributing factor.

If we did not possess adequate communications or the world's finest grid of flight aids, there would be some excuse. But look at the picture . . . 72,531 miles of controlled airways, 5,500 airports, 396 Airways Communications stations, 400 weather stations, 369 low/medium frequency ranges, 378 VHF Omniranges, 287 fan markers, 116 airport control towers, and such facilities as DME, ADF, surveillance radar, instrument landing systems and neon approach lanes in ever expanding volume.

Constantly using this vast gridiron of facilities is an American fleet comprised of 60,000 serviceable private aircraft, 1,400 scheduled commercial transports and the planes of the defense services.

That this fleet, tied into these communications could supplement general weather forecast to the almost perfect satisfaction and safety of all flying is a tenable thesis. That it does not is, however, the fact.

In the meantime, the design trend of personal aircraft, influenced by business flying requirements, moves steadily toward ships of higher performance. Such craft are less forgiving of inept airmanship, of casual handling, and of critical weather. Automatic pilots and other flight aids help to make this trend to high performance practical but can never compensate fully for lack of accurate knowledge of flying conditions en route. We must find a way to supplement with greater immediate detail the fine values of our general forecasting.

Admittedly this will take some doing . . . a comprehensive and co-ordinated program by the U. S. Weather Bureau, the CAA and the pilots themselves. The pilot burden will fall most heavily on those who least need the information. That a predicted series of scattered thunderstorms have converged to form a three-state blitzkreig may be unimportant to the jet pilot who zips over them at 40,000 feet or to the airline pilot whose airborne radar enables him to thread around the areas of heavy turbulence. Yet by the code of the airman . . . and the airman must have his codes even as does the seaman . . . a dangerous condition to the little fellow who must face the storm should be reported by the big fellow who can avoid it. And there is no doubt but what the big fellow will accept his responsibility to the code or that the government official will cooperate fully. But the whole matter must be pointed up or else the available solution goes by default.

Yet the solution does not end even with the inflight report of the on-the-spot pilot. That report must be gotten into the hands of the pilot whose immediate need it represents. This requires alertness among personnel who can convey the data to the pilot and of the pilot who needs the benefit of the report.

I find a great difference in the attitudes of those who hand out our weather briefings. One chap will toss bare forecast data at you and turn away bored. Another will try to dig into your particular problem with as great interest as though he himself were making the contemplated flight. A few of the former can make a lot of the latter look bad.

But when all is said and done, the pilot who most needs all possible weather information is often the one who is at least pains to get it. Sometimes stupid pride interferes. The hieroglyphics on a weather sequence are so much Greek to him and he's ashamed to admit he can't make head or tail of it. So he looks wise and goes out to be a victim of foolish pride.

At other times the pilot is unfamiliar with predominant weather characteristics over his intended route. He just does not have the knowledge to put various facts of en route forecast together and come up with an answer that fits his ability. On-the-spot reports from pilots along the route would serve both these gentlemen remarkably well.

In conclusion it may be noted that progress in the art of automatic flight, human nature being what it is, tends to minimize the significance of weather. And while this is natural, it is dangerous to the whole cause of aviation. Simply because the top 10 per cent of American air traffic . . . the airlines and the military contingent . . . have weather practically licked, does not justify the conclusion that its great significance is minimized. Any move which can advance the safety, comfort and popularity of private flying is of public good.

The clouds of weather can have a silver lining for all if we are willing to design it. In-flight pilot reporting is basic to that design.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher

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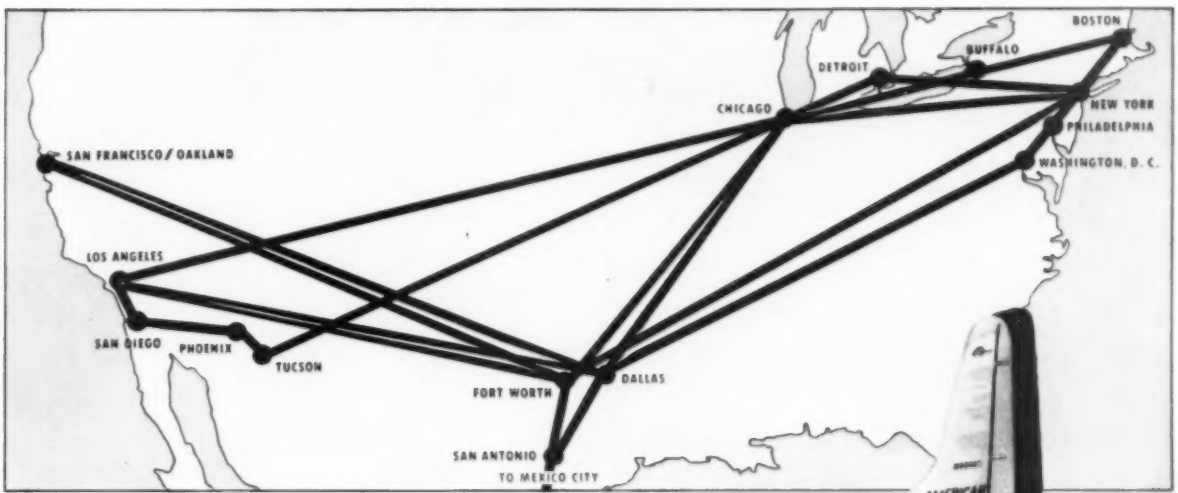

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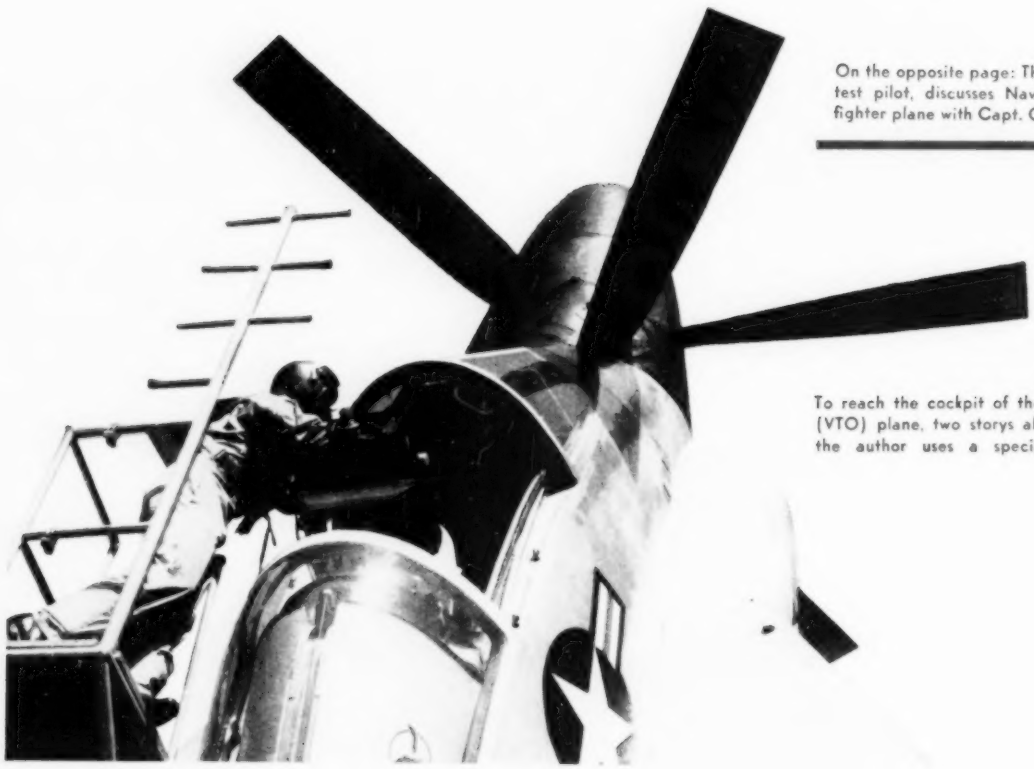


On the opposite page: The author, a Convair test pilot, discusses Navy's vertical takeoff fighter plane with Capt. C. W. Stirling, USN.

To reach the cockpit of the vertical takeoff (VTO) plane, two storys above the ground, the author uses a specially-built ladder.

Pogo Pilot

Designed to take off and land on its tail, Navy's revolutionary delta wing fighter has caught the public's fancy.

By J. F. "SKEETS" COLEMAN

Ed. Note: How does a test pilot prepare to fly a type never before designed? We asked "Skeets" Coleman, test pilot of the Convair XFY-1, to describe his preparations. Add to his description a profound devotion to duty, a world of raw courage, and the confidence built of long experience. The total adds up to test pilot of the XFY-1 or any other radical aircraft.

TO AN ENGINEERING test pilot, a new plane assignment must be like getting married again. You set up house all over . . . start living another life.

That's about what happened when I asked for the assignment to test fly Convair's new vertical takeoff fighter plane, the XFY-1. The ship is being built for the Navy as a convoy escort fighter. It's designed to take off straight up and land the same way. And until the production models start to roll from the assembly lines at San Diego, I'll live with the plane.

My boss is E. D. (Sam) Shannon, chief of experimental flight test for Convair. He assigned me to the XFY-1 early, because Sam believes a pilot can do a better job of testing if he knows every rivet in the plane.

"Use your own initiative," he told me. "Don't attempt to supervise, direct or criticize. Just bird-dog the whole project and keep us wired in on its progress."

That was over a year and a half ago, at the beginning of fabrication. Even before that, our test division had conferred with the project engineers through pre-design and design stages.

The project engineer, Burr Carroll, started weekly coordination meetings in 1952. That first session included, besides myself, the experimental shop foreman and his assistants; the lead men of the design groups (structures, wing and tail, controls, instrumentation, hydraulics, powerplants, mechanisms, aerodynamics, dynamics, planning and scheduling, contracts and hydrodynamics); the flight test engineer and the instrumentation analyst. The last two (*Continued on page* 42)

The NEXT STEP In NAVIGATION

Global military requirements demand something more than present navigational systems.

By OWEN S. OLDS
Chief of Electronic Engineering, Ryan Aeronautical Co.

DESPITE AMAZING advances in electronics, the ideal system of air navigation for military use has not been produced. Or if it has, is still a secret. Such a system must meet the stringent requirements of long range flight under combat conditions. In a recent speech, General Curtis LeMay pinpointed these requirements when he said, "The mission of Strategic Air Command is to be prepared to conduct offensive air operations on a Global basis."

This implies that the military pilot must have a navigational system which will enable him to fly to any point on the globe under all conditions of war and weather. This eliminates methods depending on ground facilities, visual references outside of the aircraft, and radio communications.

Over most of the world's surface, navigational aids from ground facilities are not available and none would be provided in enemy territory. Visual references cannot be used in bad weather. Radio communication is ruled out in war because it is susceptible to detection and counter-measure.

This narrows the choice of navigational systems to the self-contained, airborne type. In addition, the system must be fast and accurate. Preferably, it should be automatic and continuous, giving the pilot a simple, visual interpretation of all the complex data which must be coordinated.

With the advent of radio, radar and electronic achievements, a bewildering parade of navigational aids and systems has sprung into being. Eminently successful in bringing commercial and private flights to their destinations, these methods fall short of global military needs. A brief resume of the chronological development of airborne navigational aids may clarify the picture.

For ages men have dreamed of becoming airborne. But few envisaged that one of the first problems of the aeronaut would be to keep track of where he was going. Early aviators found they were floating in a multi-directional fluid.

Consequently, they navigated by ground reference. Called "contact flight," this is still a good means for getting about in fair weather and daytime. Its effectiveness decreases at night and over water and it is useless in bad weather. Even in good weather, it tends to confusion when flying is over strange country.

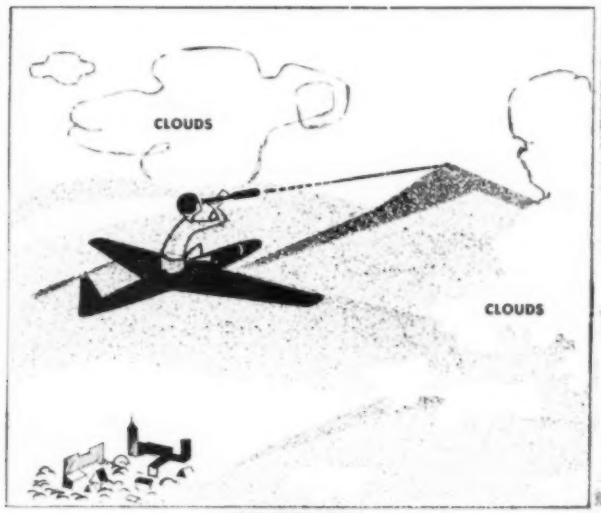
As the airplane became more reliable, a second system of navigation was adopted. This method is a self-contained system called "dead reckoning." Here, the pilot lays out his course on a map, computes his aircraft heading and estimates his anticipated progress. Once in the air, he navigates by compass and clock. In still air with perfect instruments, this would be a sure-fire system. But the air is usually not still and instruments are imperfect. Using dead reckoning, the pilot may be blown great distances off course without realizing it. His projected flight is based upon anticipated winds which may be at wide variance with those actually experienced. Therefore, the system is faulty and the flight path error increases as the range is extended.

To reduce the shortcomings of dead reckoning, another naval technique was borrowed. Celestial navigation was harnessed to aviation's use. Early airborne sextants were fashioned after the sea-going instrument. But celestial navigation does not lend itself equally to the air as to the sea. It involves taking an accurate sight upon a heavenly body.

Then, a series of time-consuming mathematical calculations must be made, using the sight data as well as information obtained from tables. If sight and computations are accurate, a reasonably close determination of the observer's position may be made. However, since it takes about ten minutes to complete this procedure, the position found is not the present one but that occupied in the past. At speeds of 600 mph, an airplane will have traveled 100 miles in the time required to determine a position. In the future, with speeds of 1000 mph, this distance would be 166 miles.

Celestial navigation depends upon clear weather. It requires a stable observation platform and good facility for viewing the heavens. These requirements cannot be guaranteed for global military missions.

Up to this point, it can be (*Continued on page* 60)



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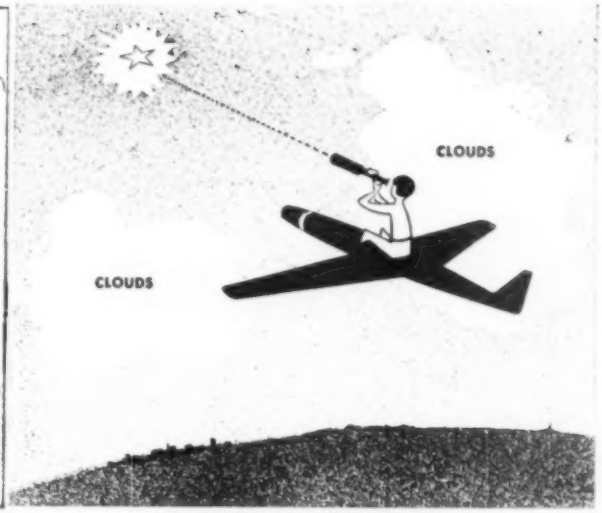

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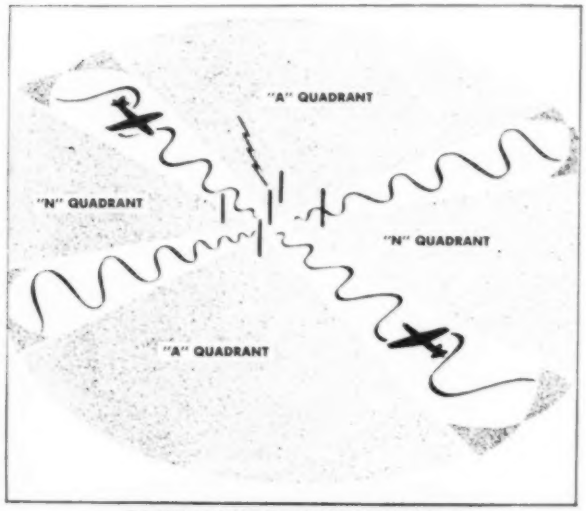

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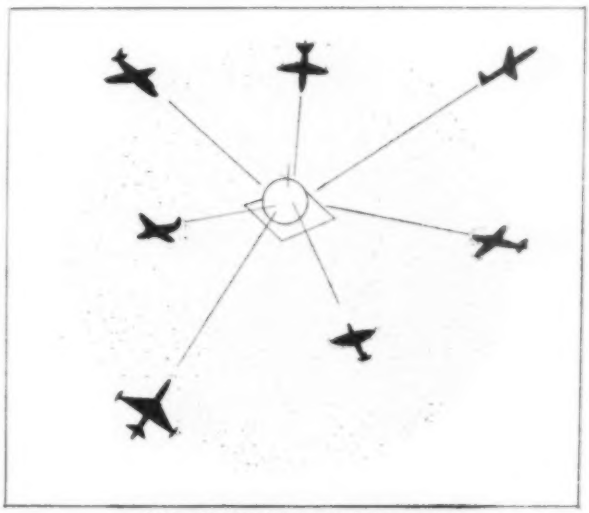
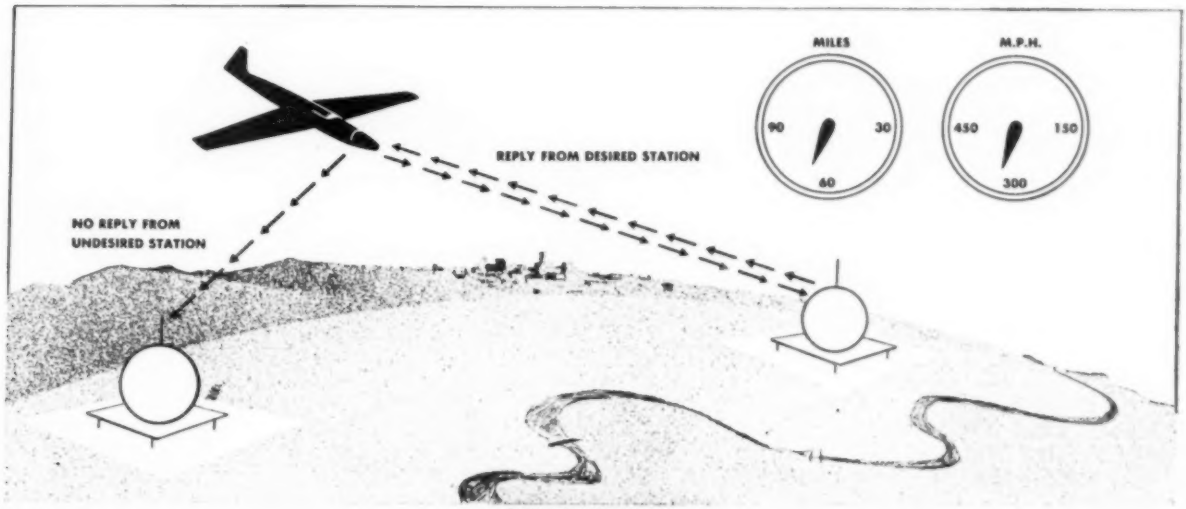


VHF OMNIRANGE STATION



DME STATIONS

The kids in the jets were making all the headlines, so what could a "retread" from World War II do with an old, left-over Mustang?

YAK in the SUN

By MAJ. ROBERT D. THRESHER, USAF

as told to ELIOT TOZER

Illustrated by ED VALIGURSKY

I WAS HUDDLED OVER the oil stove when "Dad" Flake, Lt., USAF, shuffled in. He snugged down the tent flap carefully and came over beside me.

"Ground support again," he said. The lines on his face were tight. "All the way to Sinuiju."

So we had it again. Ground support. It was all we'd had since we'd hit Korea six months back. We never climbed up to where an airplane belonged to do our fighting. Because we were flying left-overs—P-51's. But then there was a kind of ironical justice to it. Because we pilots were strictly left-overs, too. Retreads from World War II. Most of us had been in the 9th Air Force but in different squadrons.

My tour was typical. I hit England in May, 1944 in a *Thunderbolt* squadron. By July 19, I was stationed near Caen. I was lucky enough to fly 107 missions. But the 8th Air Force had done such a magnificent job on the *Luftwaffe* before we got there that I saw only four Nazis. And I never got near enough to tag one of them.

So when we got to Korea, we figured we were in. But the nod went to the new young pilots. Jet-trained, they copped the F-80's. We flew Ground Support.

And now even that was turning sour. Dead winter in Korea and the North Koreans were holed in. Buttoned up for probably six months . . . as they had been since we'd arrived. And now doubt was beginning to gnaw at us. Maybe if we did run into a bogie we wouldn't stack up any more. Time was running out on us and we wondered. And the newspapers from home didn't want to remind you, but there you were, a hot fighter pilot with a second chance, and you never made any kills. While the guys in the jets—the kids—were making headlines every day.

Dad Flake turned down the oil burner. "Take-off's at 0700," he said.

It was quiet as I dragged myself out of the Jeep in front of my *Mustang*. I gave it a quick "walk-around," my flying boots crunching the powdery snow. I jammed myself into the cockpit and struggled with the safety belt and shoulder harness. My arms were bulky in my fleece-lined, sateen jacket.

I primed the '51 carefully, feeling out each stroke. I hit the starter. The starter motor built up quickly and evenly in a pleasant wail. Fuel on. I tapped the Start Switch and the Packard caught. I cracked her throttle just a bit more and she sang and I felt some of the chill go out of me and some of the tension drain away. A good clean start the first time. The needles of my instruments were climbing up and settling down where they belonged. Good.

I looked over at Dad. His Packard was trailing billows of blue smoke. And he was cussing. I grinned. I signalled for the chocks to be pulled and blasted the *Mustang* out onto the taxi strip and braked her toward the runway. She felt good. She felt really ready.

Dad finally came beating down the taxi strip, blowing a fan-shaped cloud of snow behind him. He hit his right brake hard and swung out onto the runway in front of me.

I went through the ritual. Fuel, mixture, prop pitch. Oil pressure, cylinder head temperature. The Packard was still in a good mood. The tachometer hardly flickered as I switched from left to right mag and back to both.

Dad put his hand up and I moved into position on his right wing. I heard Ross and Ausman of the lead element pour the coal to their planes and scoot down the runway. With six .50 calibres, six five-in. rockets, and two napalm bombs aboard, the *Mustang* picks up her skirts slowly.

Then Dad had dropped his hand and I was adding throttle to stay with him. We broke ground and I had my gear up. Prop pitch back. Throttle (*Continued on page* 48)

1

THE AIR AGE AT WORK

This is the thirteenth in a continuing series illustrating aircraft at work.

"Sunset's" Heliport

Editors use helicopter thinking in probing for new ways to better living

By T. H. ALLISON

WHILE the day of "a helicopter in every backyard" still may be somewhat distant . . . still hazy in the mists of economics and engineering . . . the germ of the idea nevertheless is firmly imbedded in the average man's vision of the future.

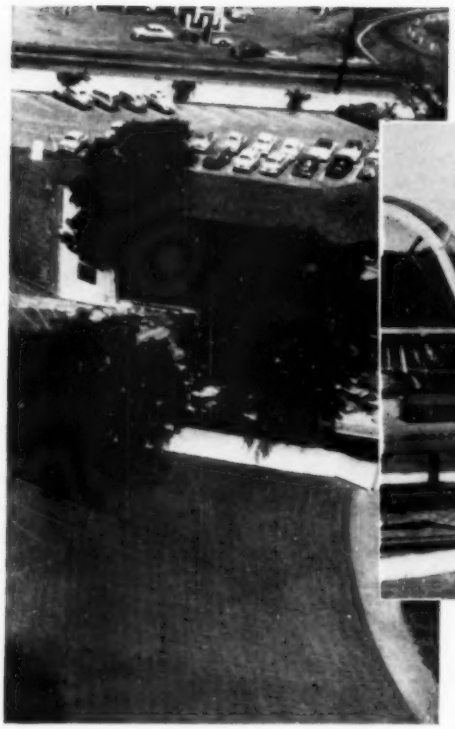
West of the Continental Divide, where travel distances are great, terrain is rugged, and surface traffic bottlenecks are tying cities in knots, the dream of direct-lift personal and commercial transportation struggles toward reality out of sheer necessity.

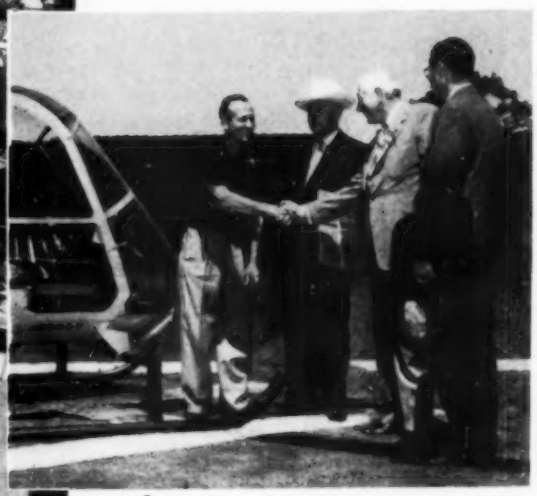
Since blazing trails toward a better way of life is peculiarly the business of magazines, it is not surprising to find the West's first private heliport in the backyard of "Sunset," popular regional magazine of Western living.

Located in the patio of the magazine's attractive Menlo Park, Calif., headquarters, the heliport brings the magazine's offices within 22 minutes of downtown San Francisco. Normal driving time over the 30 miles of heavy traffic is about an hour and a half.

First official flight to the heliport was made last summer in a Hiller 12-B from San Francisco's Public Heliport at the Ferry Building. Aboard for the initial journey were two long suffering commuters—Lowell Mainland, vice president of J. Walter Thompson Advertising Agency in San Francisco, wno calls regularly at the Sunset headquarters as the magazine's advertising account executive, and Howard Willoughby, Sunset's executive vice president, who commutes regularly between the company's San Francisco and Menlo Park offices.

L. W. Lane, Jr., Sunset's sales manager, believes that helicopter transportation, either private or commercial, may well be the answer to cutting down travel time of the magazine's executives and editors—especially between the Menlo Park offices and San Francisco. If so, they are ready for it.





2

1 Private heliport with CAA's prescribed markings at Sunset Magazine's headquarters.

2 CAA's Eugene S. Gull congratulates magazine executives L. W. Lane and Howard Willoughby while advertising executive Lowell Mainland looks on.

3 Helicopter photograph which was used in a recent issue of Sunset Magazine to show architectural and garden details.

4 Hiller 12-B comes in for a landing at the private heliport.

3

Five applications for scheduled helicopter service in the Bay Area are now pending with the Civil Aeronautics Board. When approved, service is likely to include points down the Peninsula. Sunset's heliport and "helicopter thinking" are a big boost for the project.

A way to better transportation, however, is not the only trail being blazed with helicopters by the magazine.

Dedicated to all phases of Western living—homes, gardens, food, travel and recreation—Sunset puts particular emphasis on illustrating complete layouts of Western homes planned to give maximum year-round indoor-outdoor living. Searching for better ways to present these architectural and landscape articles, the editors introduced the use of helicopter photography in a recent issue.

Again using a Hiller 12-B, this time to hover at any position above the home being discussed, photographers were able to take pictures from any angle or height. The only way this could be done before was to photograph a detailed scale model. With helicopter photographs, some houses with unusual plan or roof and some gardens can be explained much more clearly than is possible with conventional eye-level angles.

Photography, of course, is only one of an infinite number of ways in which helicopters can be used in the magazine's work of exploring and presenting new ideas for better living. As a bellwether of things to come for the magazine's many readers, Sunset's heliport already is paying dividends. END

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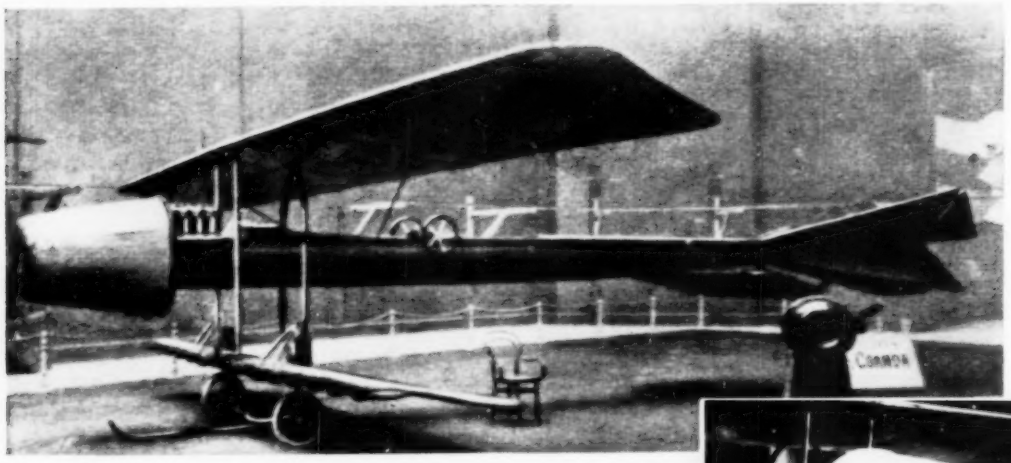


The Coanda biplane featured all-wood covering, remarkably clean lines and jet propulsion. Inset: Controversial turbine engine.

Thirty years ahead of its time, a jet propelled airplane was exhibited at the Paris Salon d'Aeronautique to become the

GRANDADDY OF JETS

By JOSEPH BONANNO

THE PARIS AVIATION exhibit of 1910 was a success. Only seven years previously, the Wrights had launched the age of flight, but in that time the French had taken to the new element with vigor. Names appeared on the French horizon to rival Wright and Curtiss, names like Bleriot, Latham, Vedrines, and Farman. Even the genial Brazilian aeronaut, Santos-Dumont, and the Englishman, Farnham, left their own countries to build and fly their machines in France.

Bleriot had flown the English Channel just the year before, symbolizing the strengthening bond between France and England, but suggesting too, the end of Britain's island impregnability. And in September 1910, just a month before the Paris Salon, the Frenchman, Chavez, had flown the alps. Aviation had come a long way since 1903, but nowhere further than in France.

So it was with mingled admiration, envy, and enthusiasm that the air enthusiasts of the world flocked to Paris in October of 1910 for the Salon D'Aeronautique. They went expecting to see the best and were not disappointed. The *Nieuport*, the *Caudron*, the *Goupy*, the *Antoinette*, the *Breguet*, the *REP*, the *Astra* and other flying machines were on display, machines that helped the French set the pace of air progress in the world of 1910. But the crowd saw even more than it expected to see.

For there was in the exhibit a new and strange aircraft, designed by Henri Coanda.

The first thing about Monsieur Coanda's biplane that caught the eye was its remarkably clean lines, the almost complete absence of wires and struts.

The tail assembly looked like no tail assembly before it. In place of the traditional fins, M. Coanda substituted a configuration of four tail-planes set at a 45 degree angle to the fuselage and at right angles to each other, resembling a St. Andrew's cross. Attached to the broad end of each of the four surfaces was a hinged triangular flap. These flaps were controlled by wheels on either side of the cockpit.

The airfoil M. Coanda designed had a conventional curvature of the upper surface but featured two curves of different radii on the underside. Under the curved surface were a number of short projecting ribs which began at the leading edge and tapered to a point before reaching the trailing edge. These, said M. Coanda, insured lateral stability by keeping the airflow under the wings parallel.

The span of the lower wing was considerably shorter than that of the upper, and neither was attached directly to the fuselage. Actually, more than two feet separated each wing from the fuselage. Conventional struts were absent. Two strong steel pipes on either side of the fuselage held the wings together. The entire aircraft was covered with a thin, highly polished wood veneer.

The landing gear was the most conventional section of Monsieur Coanda's airplane, (*Continued on page* 44)

Genealogy of American Aircraft

The most famed plane in air history was the Ryan-built, "Spirit of St. Louis".

By GILL ROBB WILSON

NOW PRIMARILY ENGAGED as a Weapons System contractor for the Government, the Ryan Aeronautical Company of San Diego, Calif., has a comprehensive background of more than 30 years in research, development and production.

Taking opportunity by the forelock wherever found, Ryan has moved in numerous phases of the industry—private aircraft, military trainers, fighters, pilotless aircraft, missiles, weapons.

Among Ryan achievements was operation of the first regularly scheduled year-round airline in the States—the Los Angeles-San Diego Airline; the design and building of *The Spirit of St. Louis;* the design of Army's first low-wing primary trainer, the PT-16; the design and production of Navy's *Fireball*, first aircraft in history to combine piston and jet power, and Navy's first jet; and design of the Air Force's first air-to-air missile, the *Firebird*. This latter project has been followed by development of the *Firebee*, a near sonic pilotless jet target drone sponsored by Army, Navy and Air Force.

Inception of the Company dates to 1922 when T. Claude Ryan, Army Reserve pilot, established a flying service with a *Jenny* on the San Diego water-front. As business flourished, Ryan moved to Dutch Flats, a safer location on the north end of the bay. The *Jenny* was replaced by war-surplus *Standards* which Ryan converted for his own use into 5-place transports with enclosed cabins. This conversion business brought many private customers and the industrial phase soon became more important than the flying service.

Ryan now designed the M-1 for the Air Mail Service. This ship became the first production monoplane in the country, and was highly regarded. Its successors led to the *Bluebird*, first of the line of Broughams which made history in pioneering air routes in many countries. The design was the basis for Lindbergh's aircraft.

Next came the all-metal S-T and S-C, sport-trainers, the latter with enclosed cabin. This was a hot acrobatic plane of its day.

With war looming, Ryan won a design competition for a military trainer with its STA. In the STA (PT-16) Army got its first low-wing primary trainer, a major departure from 30 years of biplane trainers. Of this line, the best known was the PT-22, *Recruit*, of which over 1,000 were built. Some of the trainers were used in Ryan's School of Aeronautics which, at San Diego and Hemet, Calif., and at Tucson, Ariz., turned out 14,000 pilots in the war years.

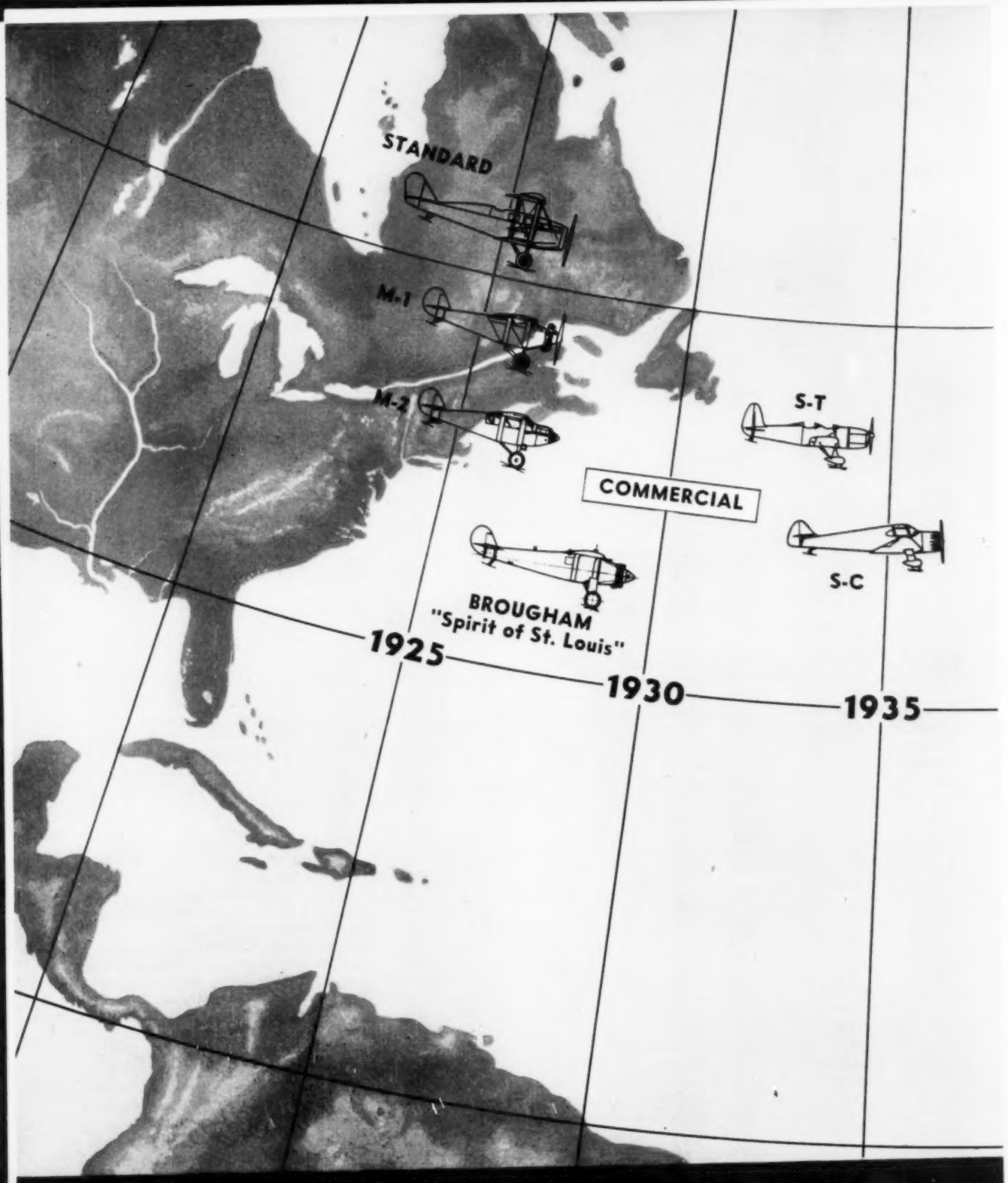
Another Ryan assignment of the war years was an experimental, short-range Army liaison craft. The *Dragonfly* YO-51, with slots along the entire leading edge and Fowler-type flaps along the entire trailing edge, could clear a 50-foot obstacle in a 350-foot take-off, hold altitude at 32 mph and land in its own length.

Aware of jet potential and exploring its use, Navy in 1942 had Ryan design and build a fighter using both reciprocating and turbine engines. The FR-1, *Fireball*, resulted. This was the first tricycle-geared aircraft qualified for carrier operations. A later version, the XF2R-1, *Dark Shark* substituted a TG-100 turbo-prop engine for its piston component.

Following WW II, Ryan returned to one of its first enthusiasms—the private plane field—by acquiring design and manufacturing rights to the North American *Navion*. Modifications based on the company's long experience with private owner requirements soon made this rugged and docile aircraft a high favorite.

By 1949, Ryan completed research on a new air-to-air missile, the *Firebird*, a 10-foot long, self-targeting rocket projectile for use in interception. The drone *Firebee* which followed is a swept wing, pilotless target powered by either a Continental *Marbore* J-69 or a Fairchild J-44, and launchable from either ground or air.

Security prevents description of several challenging projects now under way at Ryan—revolutionary aircraft as well as weapons systems. END



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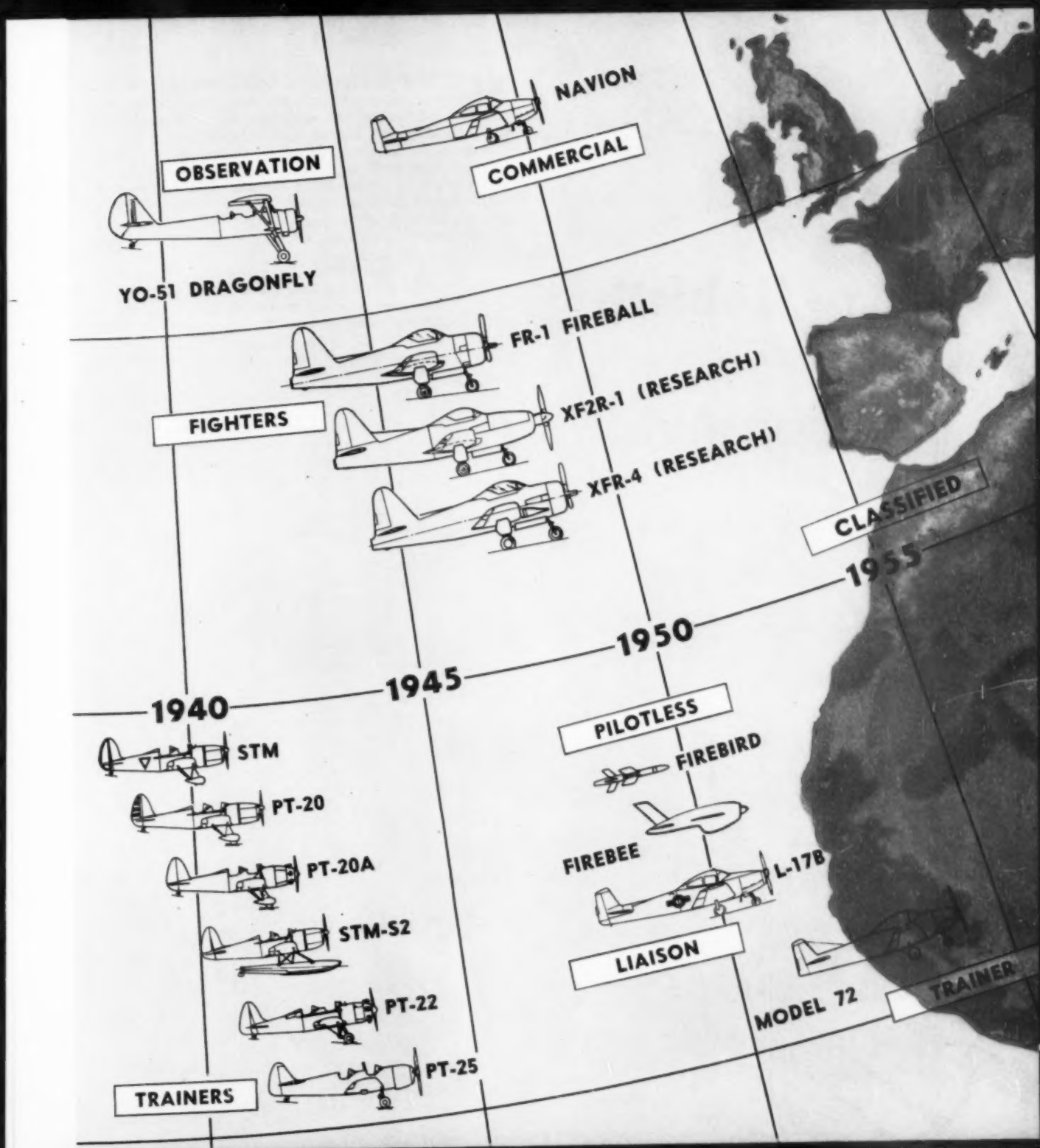


American Aircraft

The Rebirth of German Aviation

Denied air activity since 1945, western Germany prepares for her return to civil aviation.

By S. G. JOSEPH

WESTERN GERMANY is taxiing for the take-off runway of world civil aviation. Preparations are well in hand for the day when the okay is flashed from the Control Tower; i.e. the Allied High Commission.

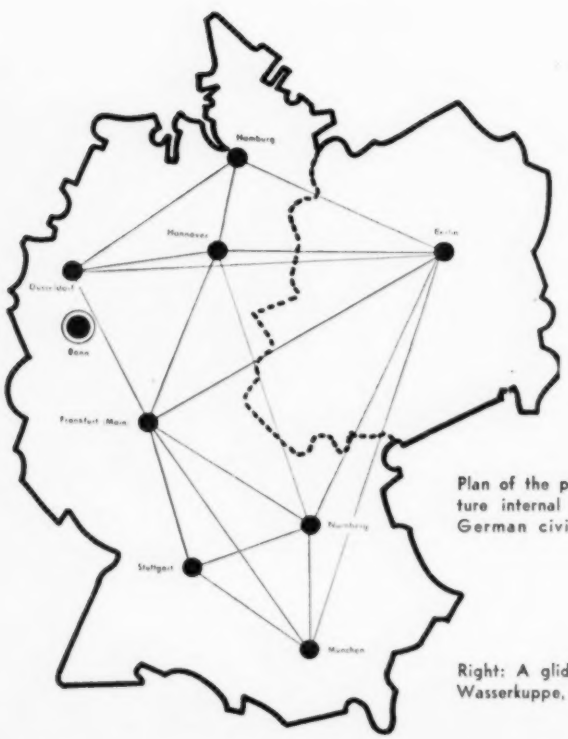
In air-minded circles everywhere the question has been not "whether" but "when"? It all depends on the general ratification of the Allied-German Treaty signed in 1952. Annex 12 of this Treaty deals with the subject of German Civil Aviation and provides for the return of air sovereignty which has been denied to Western Germany since 1945.

In August 1951, the Allied High Commission relaxed a little and allowed the Germans to construct model aircraft or enjoy gliding in such favorite spots as Wasserkuppe in the Rhön district. The Federal Government was invited, also, to form an Aviation Department within its Ministry of Transport, since the Allies intended to hand over to Germany a few functions of air administration.

One at a time, the new tasks have been undertaken—air traffic control, flight safety research—and a trickle of Germans has moved back to Administration Buildings at various airports. As far as aviation research was concerned, various organizations were gradually established to aid Germany's future air services. In Brunswick, the Society for Scientific Aviation Research was founded with Prof. Herman Blenk at the head, and a Federal Law of September 1952 decreed the establishment of a Federal Institute for Flight Safety, now established in Frankfurt.

In these ways, Western Germany has been building up practical, modern know-how on civil aviation. The moment the treaty becomes valid, the first German company will be able to swing efficiently into action . . . the first, that is, since the recent war. German civil aviation dates back before World War I. Up to 1918, their air services were already taking shape within the framework of the Military Command.

In the summer of 1919 the first commercial plane, the 4-seater Junkers F-13 was put into commission and remained the standard aircraft of the several German companies. Out of these com- (*Continued on page* 56)



Plan of the proposed future internal network of German civil aviation.

Right: A glider meet at Wasserkuppe, Aug., 1951.

THE PRO'S NEST

A new look at single engine

If you limit yourself to daylight flying, you are certainly not getting the full utilization of your airplane.

By JESSE W. STONECIPHER

Chief Pilot, University of Illinois

A FEW DAYS AGO a flying businessman stopped at the University of Illinois Airport. He was unhappy.

"I'll never be able to make it home before dark," he said glumly. "Guess I'm stuck here for the night."

He brightened when I complimented him on his plane and invited me to take a closer look. I've never seen a better equipped lightplane. It had a complete panel, Omni, ADF and an automatic pilot. The owner said it represented an investment of $27,000. An airplane was essential to his business, he explained. Since he sometimes made instrument trips, he felt he needed the very best in instruments and navigational aids.

"Look," I said, "do you mean to tell me that with an airplane like this, and with the amount of flying you do, you don't fly at night?"

If I'd asked if he were a card-carrying Communist, I couldn't have sparked a more violent reaction. When he stopped spluttering, his answer amounted to this: As a pilot, he was afraid of the dark.

This highly qualified business flyer represents a sizable group of non-professional pilots who are letting sun-

University of Illinois flight instructors, each averaging over 300 single engine night hours over all types of terrain. Duncan Cameron, who made the night forced landing mentioned in the article, appears second from right in front row. The author is at his left.

NIGHT FLYING

Charlyne Leeper, private pilot student, about to start a night cross-country with instructor Eldon Brunner.

down turn their airplanes from a business asset into the next thing to a liability. They believe single engine night flying is reckless and foolhardy. A quarter-century ago this sort of thinking made sense. Today, it's as outdated as the *Jenny*.

I think it's time we took a new look at single engine night flying.

For the record, let me concede hazards in night flying not present in day operations. But far too many of us are permitting attitudes formed in flying's youth to dominate our judgment, and make daytime-only craft out of modern airplanes.

There are three reasons many private pilots avoid night cross-countries. Two of these, fear of engine failure and fear of getting lost, are based on inadequate information. The third reason is a psychological fear of flying at night.

Let's look first at reason number one: fear of engine failure.

This was a valid reason in the days when engine failure was routine. A friend of mine who flew in the 20's ferried a ship from Chicago to St. Louis, 290 miles away. Five days and seven forced landings later, he still hadn't reached his destination. Today, the properly maintained lightplane engine doesn't behave that way.

A look at our night charter operations here at the University of Illinois should convince even the most doubtful that the modern aircraft engine is about the most dependable thing in the airplane. We fly an average of 15 trips a week involving night cross-country. All of our night work is done in single engine Bonanzas and Cessnas. During 1953, our night charters covered approximately 100,000 miles. Since 1946, when we started our charter operation, we have never had a total engine failure on a night cross-country. In all of our night flying, which includes considerable instruction time as well as charter, we have had only one off-airport landing due to engine difficulty.

That single off-airport landing came last spring, after more than six years of night cross-country flying. Duncan Cameron, one of our charter pilots, was en route home with a passenger when the engine began losing power. He flew for 12 miles toward the nearest airport, Joliet, Ill. When he saw he couldn't maintain altitude, he set the Cessna 140 down in a field. The engine was still turning on touchdown.

(*Continued on page* 50)

Scattered thunderstorms often become a solid mass

covering a large area, so if you wait too long to turn back, you may be

CORNERED

By WEYMAN S. CARVER

ONE SUMMER AFTERNOON several years ago, four other Air Force flyers and I made a cross country trip to Tallahassee, Fla. from Monroe, La. in a C-45. The sky was the shade of blue that you always hope to see but seldom do, and there were white puffs of cumulus floating around. The weather forecast en route was good, possible scattered thunderstorms but nothing we could not go around.

We climbed on course out of Monroe. The air was smooth as silk and we had some good music tuned in on our radio compass. This was the first act in a drama which, before it ended, was to leave its memory fixed in all of us.

The curtain on Act II opened as we passed over the Mississippi, about 70 miles east of Monroe. The scattered cumulus thickened, and we had to climb 8,000 feet to pass over the top. However, there was still less than five-tenths sky coverage and the current Hit Parade tunes were blaring in our earphones. But 30 minutes later, the clouds closed beneath us to better than five-tenths. I called the Jackson range station and requested that our flight be changed to an instrument clearance, stating that we would remain 500 feet on top. The forecast was still good—towering cumulus with widely scattered thunderstorms. There was nothing to worry about. I switched back to the radio compass and tuned in the swing music.

We were less than two hours out of Tallahassee when that queasy feeling which starts 'way down your spine began telling me that all was not as it should be. We were slightly above 9,000 feet and just brushing the tops of towering clouds. I realized that I had been inching up in order to avoid them. I shoved the throttles forward and pulled up to 10,000, well clear of the clouds. The air was very smooth at this altitude and the queasy feeling receded. After all, we could always turn back.

A few minutes later we were again brushing the cloud tops. I climbed until we were slightly over 11,000. The ship was mushing along at this altitude and the queasy feeling was back. There was too much cloud for the forecast and the music on the radio had changed to static. Short minutes later, the towering cumulus was billowing above us in places, but I was a man with a thousand hours and positive, with only 60 minutes to go, that we could weave through those billowy columns. If they got too close together, I would turn around and get out of there. We began wandering through them. At first they were far apart with wide saddlebacks, but as we went on it became more and more difficult to find a saddleback.

I decided to contact a range station for a weather report. I tried Meridian and got nothing but static; then I tried Mobile, Montgomery, and Tallahassee. Still nothing but static. All was not well but, according to our estimates, Tallahassee was not far.

We had been flying down a valley of cumulus for about ten minutes when suddenly a wall of it loomed in front of and above us. I looked for a saddleback. There was none. The time had come to turn around. I turned 180°. There were no saddlebacks where we had come through a few minutes before. Then (*Continued on page* 63)

THUNDERSTORM PLOTTING GRID

United Airlines is using a "thunderstorm plotting grid" experimentally as a new pilot aid to avoid turbulent areas on long non-stop flights from West Coast cities to Chicago. The plotting grid consists of a map of the airways used, divided into coordinates or "grids" of one degree longitude. Each grid is numbered. The map is mounted on both sides of a piece of fibreboard, 10 by 14 inches. The board is surfaced with transparent plastic to permit erasures and repeated use. A leather tab at one side holds a grease pencil. Radar reports by the U. S. Weather Bureau of thunderstorms on or near any segment of the route are radioed to the pilot and plotted on the grid. The course can then be changed to avoid the storm area. When no thunderstorms are in progress, the Flight Dispatch message is "Grid negative." This method is a distinct improvement over customary flight dispatch messages which locate thunderstorms in terms of cities and mileages. The numbered grids eliminate map scanning and mileage determinations.

The owner-operator's trim home and office at the edge of the close-cropped grass airport located in a broad valley nestled in the rolling hills of western Jersey.

Joe Schwanda, fixed base operator, at work on another hangar for Hackettstown Airport.

Man with a **hammer**

By building his own hangars, this operator makes a good living from a small fixed base business.

By FRANK HARVEY

LUCKILY FOR A LOT of us modestly heeled private plane owners, the will-to-win flows strong in a heavy percentage of, also modestly heeled, fixed base operators.

Certainly plenty of country fields closed up following slowdown of the G.I. program and around most metropolitan areas the hangar rents and maintenance costs gradually crept beyond our means.

Caught in this squeeze, many owners gave up the ghost and, worse still, the youngsters went hot-rodding.

But the tide is turning and operators like Joe Schwanda are turning it.

Joe Schwanda, owner and operator of the Hackettstown Flying Service, Hackettstown, N. J., has not raised his hangar or tie-down charges—and neither is he going out of business. As a matter of fact, Joe's business is getting better every day. He charges $15 a month for a *Cub*-type airplane, $20 a month for a *Navion* or equivalent, and $5 for tie-down. Everything else on Joe's field is scaled to fit the poor-but-eager pocketbook. Joe changes your oil (I personally paid $4 labor at one field to have mine changed) for just the price of the oil. Joe holds overhead down every way he knows. Instead of mailing out bills at the first of the month, he waits until you show up to fly, and hands you your bill. You pay him, he signs the slip as your receipt, and that's that. Everything is as quick and neat as possible—and the dividends get handed on to the clients in low hangar rentals. Right now Joe has 18 planes under roof, and two on tie-down, and he could put another 18 under roof tomorrow, if he had the roofs.

How can he do it? Joe has a formula which is as old as people, but which seems to have gotten lost in the shuffle in America's shift to subsidized economy: *Joe's not afraid to sweat.*

The hurricane which swept through New Jersey in November of 1950 smashed Joe Schwanda's operation flat. When the big breeze died down, all Joe had left were his two hands and the help of his 12-year-old son and his 73-year-old father.

Today, in 1954, Joe has built—*practically single handed*—an 8-plane hangar, a 5-plane hangar, and three 2-plane hangars. All are A-1 construction, water-tight, solid, hurricane-proof and Joe is just hitting his stride. He has virtually unlimited space on his big, 65-acre, sod field, and he intends to go on building 2-plane hangars until the place looks like a housing development.

As soon as Joe completes a hangar, presto, it's full—and not with "just anyone who can get up $15." Joe knows that metropolitan fields charge $45 for hangar space, and $20 for tie-down, and he knows he is in a position to select his clientele (*Continued on page* 58)

Some of the neat, well-constructed hangars of the Hackettstown Flying Service.

Annabelle Scheisher, Gloria Knight and Patti Daley, hostesses on Braniff plane used by President Eisenhower on campaign flights throughout Texas.

A Philippine Airline's attendant, Maria Teresa Larrazabal, who has both beauty and intelligence.

The DISTAFF SIDE

What does it take to be one of these competent, friendly, lovely young ladies who serve the airways of the world?

By DICK LACOSTE

Pretty TWA stewardess throws snappy salute.

Plum pudding to be served aloft by BOAC stewardess

Two future American Airlines hostesses scan the routes they may fly when full-fledged members of AA staff.

Below: Charlotte Cooley, U. S. Air Force Flight Nurse about to board MATS plane.

OUR average American flight hostess need not be as sinuous as a cinema star, but she must be from 5 ft. 3 in. to 5 ft. 6 in. tall with proportionate weight, not exceeding 125 pounds. She must be single, unmarried, and between the ages of 21 and 26.

For foreign airlines, the average age of the hostess is 26, while height and weight requirements are more flexible.

Educational requirements for most U. S. airline hostesses are two years of college or its equivalent. More demanding foreign airlines require at least two languages.

Even after a good-looking, well-educated, U. S. lass has passed preliminary interviews, the odds against her being chosen are 100 to 2. For foreign applicants, the odds are more than 200 to 1.

Both U. S. and overseas airlines project the average useful life (to them) of flight hostesses at one year. Within that time, the average hostess has found romance and quits her job to get married.

For those who marry, here's the breakdown for the average U. S. hostess: 30 per cent marry company people; 26 per cent marry the boy back home; 21 per cent marry passengers; 23 marry other groups (doctors, lawyers, engineers, business executives, salesmen).

Lest girls get the idea that being a flight hostess is all romance, here are some of the routine duties an average stewardess performs yearly:

She walks 135 miles up and down airplane aisles. She punches the coffee jug or tea pot button 5,840 times. She handles almost 400 children.

Lastly, she tells more than 3,000 lonesome men she already has a date that night. END

"To buy or not to buy" a wind-damaged Luscombe 8A.

Letter to a Fledgling:

Some practical pointers to assist the prospective used plane purchaser in his selection of an aircraft worth re-licensing.

By RALPH KORNGOLD

Dear Walter:

It was great to learn that you are thinking of getting a ship of your own. Frankly, I was afraid your first money would go into a hot rod.

Well, you've got a lot of fun in store. Lot of headaches, too, but you'll learn plenty and that's a satisfaction, much more than if everything were handed you ready-made in a government program.

You say you are anxious to get the experience and are willing to put in the hours. In that case, look for a ship that needs considerable work, at a really low price rather than pay more for one, possibly licensed at the moment but which will require an equal amount of work, once the license expires. If you start from scratch and go clear through it, you'll wind up with a really clean ship which will give you several hundred hours of trouble-free flying. That's preferable to some mediocre job that is never quite right and a continual liability for repairs and replacements.

What kind of a ship should you get? Each one has its advantages. They were all good ships in their day and there is the crux of the matter. Anything wrong with them, now that they are old timers, will probably be a result of weather, rather than rigorous service. In general, the more sheet metal and the less wood and fabric you have, the better shape they're apt to be in.

Make a tour of the airports in your vicinity. Look for ships that are not being flown: tires flat, dust thick on the windshield, general rundown appearance. Check the airworthiness certificate to see if it's expired. Get the owner's name from the registration and drop him a card. You'll see many ships completely abandoned and apparently forgotten. Talk to the mechanics in the shop. They pretty well know the history of every ship on the field and what kind of shape it's in. Sometimes you'll hear of one the owner has taken home and stored in his garage to save hangar rent.

When you find one you like and get a price on it, and are wondering if it's a good deal, start figuring the cost of the new parts and supplies needed to put it back in shape.

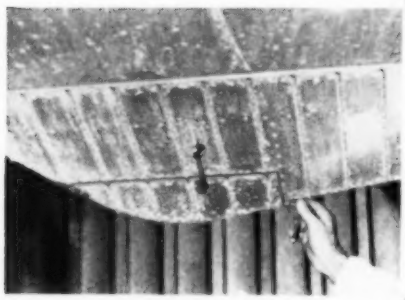
The condition of the fabric should be your first consideration as it can well be your greatest source of expense. Have a sample tested by the local office of the CAA. With the owner's permission, cut a strip from an exposed area of each wing, a little over 1 in. wide and about 6 in. long, so you will have enough for several tests. If the fabric develops less than 70 per cent of the strength of the original covering it, should be replaced. Rejuvenator can revitalize old dope and improve the finish, but cannot restore strength to the fabric. The price of the aircraft should be adjusted accordingly, as it would cost the owner over $300 to have the wings recovered.

You can do the job yourself with about 36 yds. of fabric and 22 gallons of dope at a cost of approximately $145.

1
Inspecting spar for possible damage necessitating major repair.

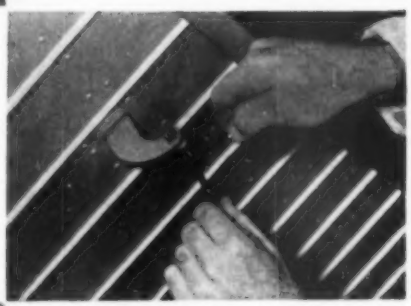
2
Fabric sample is taken from upper wing surface. Note bad spot in dope below mechanic's hand.

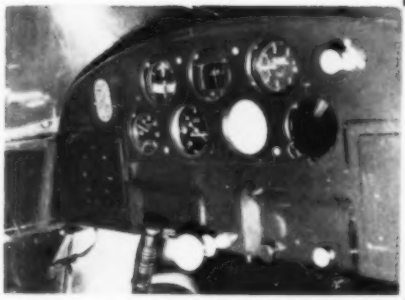
3
Checking tires for deep cuts and bulges, a sign of broken cords.



4
Corrosion almost entirely covers alclad unpainted tail surfaces.

5
Untwisting aileron cable to see if rust has weakened the strands.





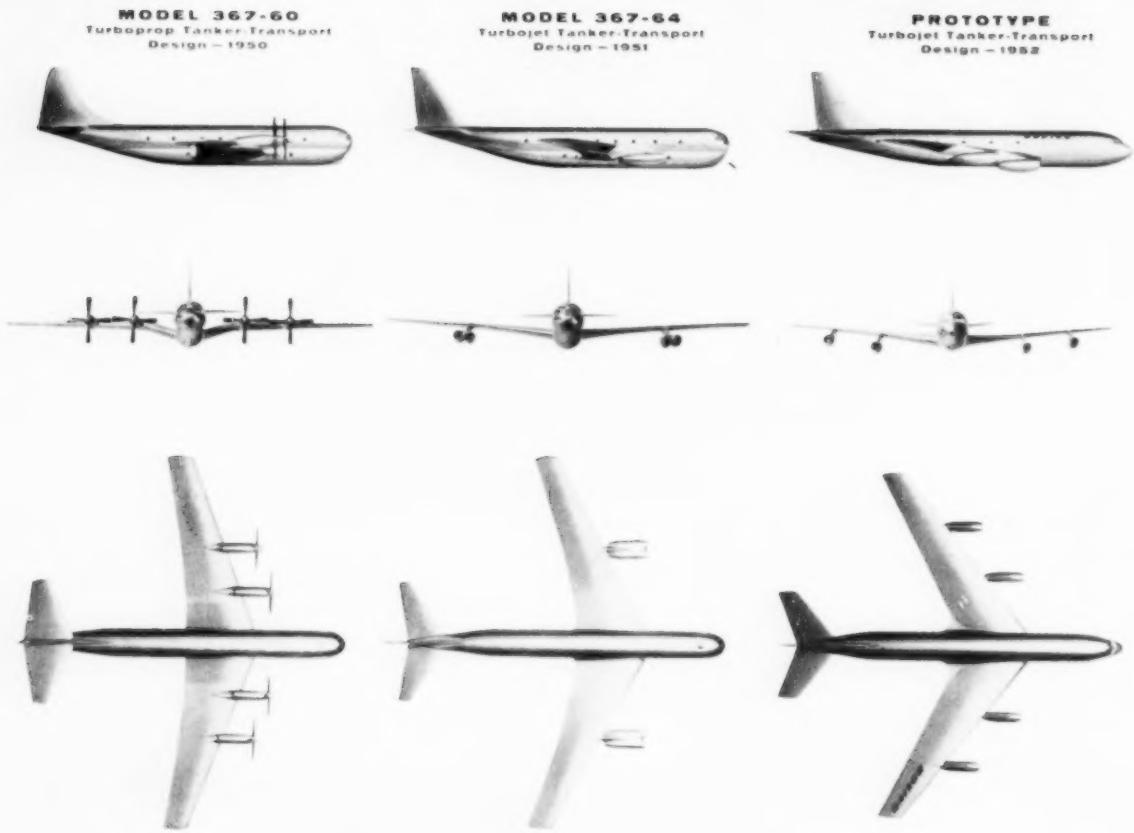
6
Missing altimeter must be replaced to meet CAA requirements.

7
Determining how much waxed rib cord the little mouse has eaten.

Shop around plenty for the things you need.

The engine is second in importance and it's usually pretty much of an unknown factor, because there's so much of it hidden. You can never tell for sure what you've got without tearing it down completely and making a thorough inspection. Several things will give you at least a hazy picture. Check the log books for "total time," and "time since overhaul." The way most lightplane logs are kept, you should add about 30 per cent. So if it has 500-600 hours logged, you can bet it's due for a major. A "top overhaul" in the log, at this point is of no value whatsoever. Reliability should always be the first consideration in an engine, and can be assured only by regular major overhauls, with the inspection of *all* parts by every means available. This service by an approved shop would cost $200 to $250 excluding any major parts replacement. Hence the tendency to defer it as long as possible.

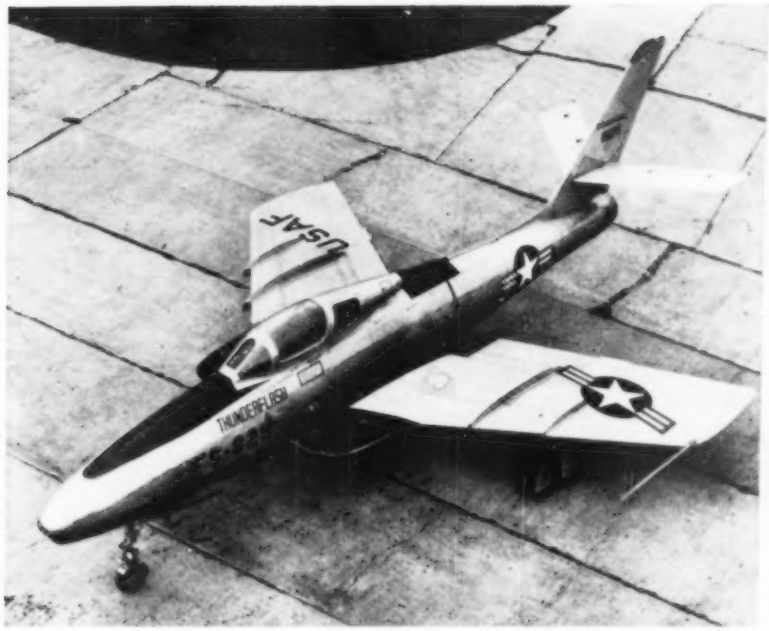
However, if the log shows, say 250-300 hours, a top overhaul is all that is indicated. (*Continued on page* 64)



DESIGN EVOLUTION Boeing's turbojet tanker-transport did not spring full-blown upon the drawing board. Product of an orderly evolution involving some 150 jet planes that have never flown, its obvious ancestors are its flying predecessors —B-52, B-47, KC-97 and *Stratocruiser*. But they are vastly out numbered by the 150 designs which went into the prototype. Of turboprop models, most serious consideration was given to the Model 367-60, shown above left. As thinking moved toward all-jet power, the 367-64 was born. With numerous refinements, "Project X" was initiated—construction of a jet transport prototype, above right, now well along the way to flight test

NEW COUGAR The F9F-8, new model of Grumman's sweptwing F9F-6 jet fighter, is faster, more maneuverable and has greater range. Available "g" for turning at high altitude is twice that of the previous model. Improved performance was achieved by modifying the leading and trailing edges of the wing and lengthening the fuselage. The moveable wing slot was replaced with a fixed, cambered, leading edge, and the trailing edge was extended, increasing the chord of the wing by 15 per cent. The relatively thinner wing increased the *Cougar's* speed, while the larger wing area and cambered wing improved maneuverability and low-speed handling characteristics. The F9F-8 is powered by a Pratt & Whitney J48 turbojet.

Have you seen?



THUNDERFLASH Above: Republic's RF-84F high speed, photo-reconnaissance fighter named the *Thunderflash* has air intake ducts in the wing roots to permit installation of a sweeping variety of cameras in the nose. It mounts four .50 cal. machine guns in the wings. The giant RB-36 bomber can launch and recover the RF-84F by means of a trapeze mechanism.

JET CESSNA Left: First true jet side-by-side trainer to be produced for the Training Command. An Air Force contract for engineering and tooling design on the T-37A has been received by Cessna. The original contract for a prototype jet trainer was awarded to Cessna in competition with some eight other aircraft companies submitting a total of 15 different designs. Progress is well underway at Cessna's Prospect Plant.

SKYLARK Right: Now in flight test stage, the *Skylark* SRX-1, designed and built by Robertson Development Corp. of St. Charles, Mo., has cruise in excess of 150 mph, minimum speed of 25 mph. Can operate from turf fields less than 100 feet long. Stall-proof, spin-proof, the all metal plane incorporates a series of new aerodynamic components: full-span wing leading edge shrouds; full-span double-slotted flaps; spoilerons on top of the wing; turbulator control; all-moveable horizontal tail; elevances; and spinner duct cooling. Powered by a Continental 260, the *Skylark* has also been designed to accommodate a turboprop system. The four or five place aircraft has an empty weight of 2250 pounds, normal useful load of 1250, and a utility useful load of 4,000 pounds.

"... eeny, meeny, miny, moe."

Loading your airplane

By LORRAINE ROSSER

THE AVERAGE PILOT is all too often completely unaware of the weight and balance limitations of his airplane, and of the reasons for these limitations.

For instance, do you know that it is not possible to carry full fuel tanks, fill all seats and carry a maximum of baggage or cargo and remain within approved weight and balance limits of many civilian aircraft? In one popular four-place model the fuel tanks may not be filled to capacity when four occupants and their baggage are to be carried. Another, a two-place craft, can have no baggage in the aft compartment when spins are to be performed.

At first thought, it may seem foolish to provide such large fuel tanks if you are not to be allowed to fill them under certain conditions. But that extra fuel is a definite asset on a long trip when, say, only two passengers are being carried. And it would be equally foolish to forbid carrying of baggage in the other craft when it is only in the execution of a spin that the weight would have an adverse effect.

Weight and balance limits are placed on airplanes for two main reasons: First, the effect of the weight on the aircraft structure, and second, the effect of the location of this weight on flight characteristics, particularly in stall and spin recovery and on stability.

A knowledge of load factors in flight maneuvers and gusts will emphasize the importance of an increase in the gross weight of an airplane. A load factor is the ratio of the total air load acting on the airplane, to the gross weight of the plane. For example, a load factor of 3 means that the total load of an airplane's structure is three times its gross weight. For instance, in a 60° bank you have a load factor of 2. This means that, while in this bank, your airplane must withstand an added load of two hundred pounds for each one hundred pound increase in weight. In recovering from a spin, your load factor is normally 2.5 to 3 load factors—that's an extra 250 to 300 pounds for each 100 pounds of weight.

An approved civil airplane has been tested for flight at the maximum gross weight authorized, and within the speeds posted for the type of flight to be done. Flights at weights in excess of this amount are quite possible, and often well within the performance capabilities of an airplane, but this fact should not be allowed to mislead the pilot, who may not realize that loads for which the airplane was not designed are being imposed on all or some part of the structure.

The rearward center of gravity limit of an airplane is determined largely by consideration of stability. An airplane loaded too far rearward is unstable in flight which is uncomfortable to occupants and can even become dangerous by making the airplane unmanageable under certain conditions. A recovery from a stall becomes progressively more difficult as the center of gravity moves aft and a rearward position can produce undesirable spin characteristics, even resulting in a "flat" spin, that condition where it becomes impossible to get the nose down and, therefore, recover from your spin.

It should be noted that any of several factors might tend to cause a tail heavy condition: an unusually heavy student in the rear seat of a tandem trainer, an excessive amount of baggage in an aft baggage compartment, or nearly all the fuel in a forward tank being consumed. An airplane loaded to the rear limit of its permissible center of gravity range will handle differently in turns and stall maneuvers, and will land differently than when it is loaded near the forward limit.

On the other hand, an airplane loaded excessively nose heavy will be difficult to taxi, particularly in high winds, can be nosed over easily by use of the brakes and will be difficult to land without bouncing, since it tends to pitch in on the wheels as it is slowed down to flare out a landing.

When an airplane bears a placard requiring that it must be flown solo from a certain seat, that a given tank is to be emptied first, or that a compartment or seat is to be left empty under certain conditions, the pilot may rest assured that the placard is necessary for some well-founded reason. Such placards should be maintained in the airplane, and observed. END

(Reprinted by permission of the Connecticut Department of Aeronautics from its Aviation Newsletter.)

An unauthorized flight over

enemy territory in bad weather prompted this

artillery liaison pilot to say

I learned about flying from that!

By HUGH C. NICHOLS, JR.

THE AIRPLANE HAS COME a long way to safer flying but pilots continue to make the same old mistakes.

I was a field artillery liaison pilot, with enough air medals to make me think I was pretty hot. My battalion was a part of General Collins VII Corps. We pursued the Germans across France and Belgium, and in mid-September, with our ammunition and gas exhausted, watched them withdraw behind the Siegfried Line. The campaign settled down to a dreary slugging match in the Hurtgen Forest.

My landing strip in the outskirts of Walheim was a pasture, about a thousand feet long. It was crossed by several wire fences, and my ground crew simply cut the wires down, uprooted several posts and dragged the dismantled fence back on either side to leave a passage down the center. Being a farmer myself, I hated to tear down more fence than necessary.

On this particular day I had flown reconnaisance in the morning and in the afternoon decided to fly back to Liege, Belgium, to attend to some business. I neglected to inform the colonel of my intentions, since he might demur. I would be back early anyway —I thought. Liege was only 50 miles to the west, and I knew the route well. We had liberated the town and my former landing strip lay only a few hundred yards from the trolley line into the center of town.

The author with his L-4 in Walheim, Germany in 1944.

The day was dreary and overcast: typical for the time of year in that vicinity. I landed the L-4 Piper, chocked the wheels, gave my friend, the farmer, a pack of cigarettes to look after it and was on my way down town.

Some hours later, as the tram crept back toward my waiting plane, I realized all was not well. It had grown ominously dark and begun to drizzle. Night was not far off. Sprinting from the trolley stop to the field, I propped the *Cub*, and took off over the slag heaps. Forty minutes flying due east would get me home, so I was still not overly concerned.

Then things began to happen! Dead ahead, the weather closed in solid—a squall line of heavy rain. I bore off to the north, skirting it until I could turn east again. Fifteen minutes later, I turned back south-east, held the direction for a few minutes, and looked for check points. I realized, with that sinking sensation, that I was lost. Lost under low clouds in a drizzle, over inhospitable terrain, with night coming fast. Like a bird dog, I boxed the compass, looking for some familiar spot below. Then, away off to the south and east, I saw a burst of white phosphorous smoke—and another—and another. "Thank the Lord," I said to myself. That artillery preparation must be on Aachen—and now I knew where I was. I advanced the throttle, trimmed the *Cub* nose-heavy, and away we went for home at 90 mph.

Ten minutes later, I was skirting the embattled city to keep away from enemy territory and, in the fading light, saw the First Division Artillery's planes on their strip directly below me. It was almost completely dark now and my home field still lay seven or eight miles ahead. My first thought was to get down as fast as possible. I knew that my buddies from Big Red One would welcome me and send me home by jeep—even in the black-out. And they would fly my plane over in the morning!

"Heck, no," I thought. "I'll fly this grasshopper home. The old man might drop by and ask some questions. And, after all, it's only a few more minutes."

So I held my course, and the friendly strip fell away behind me. And then suddenly, as though some invisible hand had dropped a curtain, it was dark. The earth below was black. Only those who have seen nights where total black-out restrictions are in force know just how dark it is when all man-made lights are curtailed.

I had gotten out of the frying pan and jumped back in the fire. Somewhere below me my crew was sitting around the stove, with blankets over the windows to keep a light from leaking out, wondering no doubt what the "lootenant" had goofed off into this time. But as far as helping me, they might as well be in China.

While I sat there cursing myself for an idiot, another thought chilled me. All Allied (*Continued on page* 43)

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full tme staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

ICAO ALPHABET

Last month's AOPA *News* reported the latest AOPA comments to the Air Coordinating Committee on the ICAO (International Civil Aviation Organization) phonetic alphabet.

Quotations from the AOPA letter to the ACC voiced AOPA's continued strong objections to the use of the new alphabet (Alfa, Bravo, Coca) by civilian pilots under any circumstances, and reiterated AOPA's stand that the present use of the ICAO alphabet by CAA airways personnel is a deliberate means of enforcement by pressure rather than by regulation.

Replying to AOPA's objections, Fred Lee (AOPA 1585), CAA Administrator, ignored the basic AOPA contention and went to great lengths to reassure all pilots that there is no requirement for the use of the ICAO alphabet and that no mandatory requirement by regulation is contemplated by CAA.

Mr. Lee quoted from the Federal Airways Manual of Operations those portions which establish the ICAO alphabet as a standard for airways personnel use while permitting individual pilots to use any alphabet they choose—but only on special request.

Commenting further, Mr. Lee said, "Frankly, we in the Administration consider the universal use of a standard ICAO alphabet to be a desirable long-range objective, and we shall continue to work for improvement of the alphabet, particularly since the adoption of the ICAO phonetic alphabet has been helpful in promoting greater acceptance and use of the English language in international radio telephone communications . . . we have other more important objectives, such as the encouragement of all pilots to equip their aircraft with adequate radio . . . The procedures used by the pilot are of minor importance . . . To achieve standardization through persuasive means will require much time and patience."

WEATHER BY RECORDING

It may soon be possible for pilots in some large cities to dial a special number to get a tape-recorded run-down on current aviation weather in their areas, thanks to an AOPA suggestion to the Weather Bureau and the telephone company. The recording would be changed hourly.

AOPA proposed the system as a possible way to relieve the increasing phone-answering burdens of weather station staffs.

Both the Weather Bureau and the Washington, D. C. phone company are interested. They are now discussing equipment and costs.

If the system proved successful when tried in the Washington, D. C. area, it would be recommended for use throughout the country.

AOPA 180° RATING

Both CAB and CAA are interested in the "AOPA 180° Rating," AOPA's experimental life-saving course for inexperienced pilots now being developed under an AOPA Foundation grant by the Institute of Aviation of the University of Illinois.

The two agencies have been so concerned with the large number of weather flying accidents, caused by carelessness, inexperience or over-confidence, that they have been considering revising the Civil Air Regulations accordingly. They now hope that AOPA's "180° Rating" is a step toward the voluntary solution of its weather accident problem by the civil aviation industry.

To get a first-hand report on the course Kenneth R. Aldrich, Chief of the General Operations Branch of CAA's Office of Aviation Safety; and Bert A. Shields of CAB's Bureau of Safety Regulation, went to the University of Illinois in April to take part in the experimental course which has been under way for some time.

Tests of the present experimental curriculum are being made with 20 "guinea pig" pilots. Flights, with instructor and student only, are in a specially-equipped *Bonanza*, loaded with sandbags to maximum gross weight and maximum rearward center of gravity

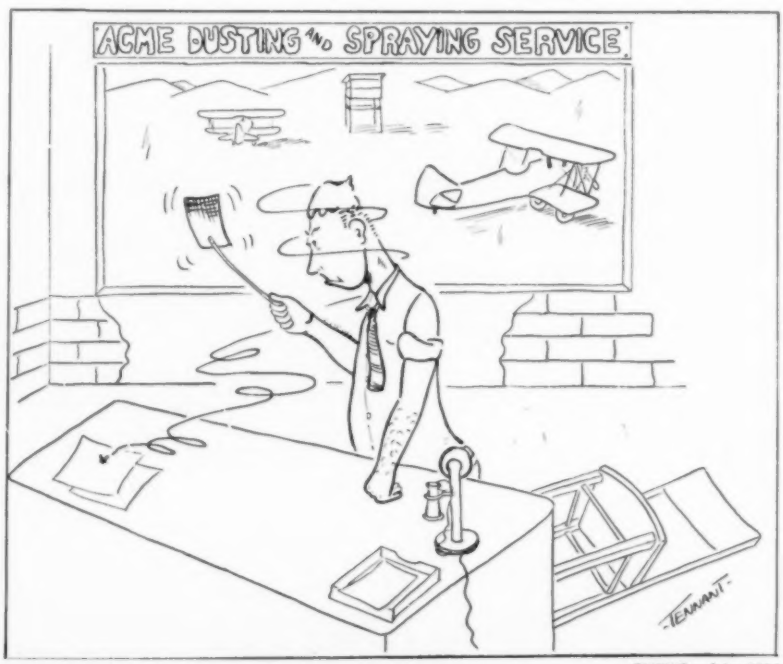
Although none of the 10 young private pilots, or the 10 older pilots taking the course in testing operations has had previous instrument flying experience, not one has yet failed to absorb the technique for safely controlling the airplane and making a 180° turn out of instrument weather, using only rudder, trim-tab and throttle adjustments.

ANTICOL

AOPA's collision-avoidance device, *Anticol* (packet of Kleenex for cleaning windshields and pilots' sunglasses) got new attention in April when COPA, AOPA's affiliate in Canada, imported the idea.

After a mid-air collision between an RCAF training plane and a Trans-Canada Airlines transport, fatal to 37, the Canadian Owners and Pilots association wired AOPA for *Anticol* literature. AOPA rushed several hundred *Anticol* wrappers.

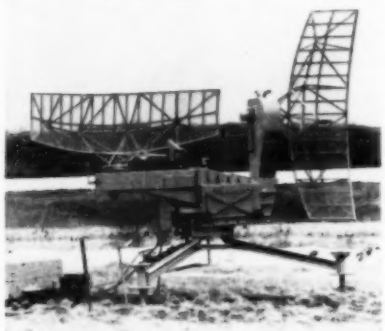
The wrappers were like the ones used to wrap the Kleenex packets distributed last year by AOPA to Government officials and the press. At that time AOPA emphasized that mid-air collisions are caused to a great extent by pilots who do not look where they are going.



Briefings . . .

THE 1954 Sportsman Pilots Cruise from Miami to Havana in which 43 planes participated was made in perfect safety and with no mishaps. It preserves intact the record of complete safety which has marked the Sportsman Pilots Cruises since 1937 in which 2,000 persons in 650 planes have flown between Miami and Havana.

LOW COST GCA has been developed by Laboratory for Electronics, Inc., of Boston. Designed for use in either tower



or mobile unit, the equipment, called SPAR, will cost about $30,000 to $35,000 according to present estimates, and requires only one operator.

COMPLETE twenty-four hour service on all types of privately-owned aircraft is now available at Remmert-Werner's new Toledo, O., base. In addition to providing maintenance and repair facilities, it is expected much of the company's major aircraft conversion program will be centered at Toledo.

PHILIPPINE Air Lines has suspended all long-range international operations. PAL will concentrate on its domestic system, and expand its Southeast Asia services. Funds otherwise needed by PAL for new long-range equipment will be channelled into Philippine President Magsaysay's program for improvement of domestic airports, thereby strengthening the National defense in case of emergency.

BUGABOOS about pilots' physical reaction to loss of cockpit pressurization at five-mile altitudes have been dispelled to great extent by a report from Lockheed scientists that only minor effects, if any, result from sudden decompression at the height where most folks fly. Experiments in instantaneous pressure change, involving 381 Lockheed employees, describe the experience as "a comparatively innocuous procedure."

PRIVATE and business flying activities at Stockton Field in California brought almost one million dollars into the community in 1953.

SLEEPER fare of $25 is now available on TWA's Super Constellation "Ambassador" flights between New York and the West Coast. The berth charge, a reduction from $90, is now less than cost of a Pullman lower.

AVIATION Distributors and Manufacturers Association will hold its Mid-Year Meeting at the Stanley Hotel, Estes Park, Colo., June 21 through 23.

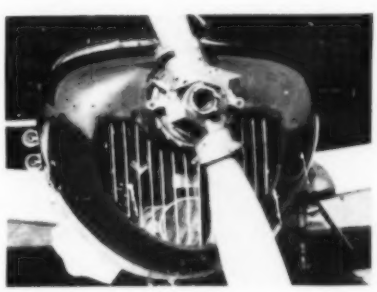
AN AUTOMATIC pilot for light planes, developed under CAA contract by the Ansco Division of General Aniline and Film Corp., has been successfully flight-tested by CAA. In addition to controlling roll and pitch, it provides for automatic flight on any selected magnetic heading and for homing on omnirange stations.

LEAR Aircraft Service Division has been designated a CAA Certificated Repair Station—Airframe Rating, Classes 1, 2, 3 and 4. Located at Santa Monica, Calif., the division offers aircraft maintenance and repair; design and installation of custom interiors; installation of radios, autopilots and other special equipment; and engineered major airframe modifications such as the *Learstar*.

VALID PILOT's licenses are now held by 11,231 U. S. women, according to Government records. Of these, 5,101 have currently effective medical certificates.

FLIGHT scholarships to eight of Illinois' Waukesha County High Schools have been offered by the Spring City Flying Service, Waukesha. Each school will select one boy or girl to receive 35 hours ground school and eight hours of flight instruction

CAA HAS APPROVED alteration of Ryan *Navion* 260's by Spartan Aircraft Co., of Tulsa, Okla., refining original engine installation to provide lower temperature



levels. Heat from exhaust stacks is diverted and baffles and sealing clearance are redesigned. An effective ram air duct supplies air to the oil radiator. *Navion* owners may contact F. J. Tolley, Aviation Service Division of Spartan for further particulars.

AIR RESERVE officers on inactive status may now earn retirement points by engaging in Ground Observer Corps activities. All inactive reservists in the GOC program will be hand picked for suitability, and will work as assistants in training and organization on a non-paid status.

CONVERSION of Cessna T-50's, aimed at providing twin-engine equipment within the price range of the average business man or fixed-base operator, are under way at Rapidair, Inc., Municipal Airport, Springfield, Mo. Several interior arrangements are available for ambulance cots, passenger seating, or cargo space.

BRITISH Air Racing Champion for 1953, Squadron Leader James Rush, called on Fred Glass, president of the Wings Club, to extend greetings from the Royal

Aero Club and a sincere invitation to American pilots to enter the Royal Aero Club Trophy race in June. An international handicap event flown over a 200-mile course, the race is open to any type of aircraft with a maximum speed of at least 130 mph.

PARAMOUNT is making a motion picture called "Strategic Air Command," starring James Stewart and June Allyson. The film is based on the story of the B-36

TO FLY VFR INTO, out of, or in the vicinity of an airport having a control tower, you must have at least 1,000-foot ceiling and 3 miles visibility or you must have received *prior* permission from the airport control tower.

BROOKLYN Dodgers were lauded recently by CAA Administrator F. B. Lee for their use of a DC-3 in transporting players and personnel. Thirteen years ago two members of the team were fined $500 by the club for taking flying lessons.

CAPE ANN Flying Club of Gloucester, Mass., is the 1954 recipient of the Hughes National Aviation Safety Trophy. Awarded annually by the Central Valley Empire Association of California, the trophy goes to the competing flying club which has the best safety record for the

(Continued on page 46)

Pogo Pilot

(Continued from page 14)

and I made up the experimental flight section.

These weekly meetings assessed what had been done on the plane during the last seven days, and what would be done on it during the next seven. The discussions covered everything about the plane —everything every design group was doing.

Between meetings, I prowled the experimental shop, consulting with the people who were building the components, asking questions and absorbing all I could.

On any new plane—but particularly on the XFY-1, which is designed to do something no other plane ever before has done—the test pilot starts from zero. There's a lot to learn and a lot depends on the test pilot's learning it.

I studied the blueprints, wiring diagrams and schematics. I haunted the personnel of the experimental shop and the engineers in every design group even remotely considering the airplane—the hydrodynamics group, for example. Hydrodynamics built and tested models of the XFY-1 to determine its ditching characteristics. Since the XFY-1 is to be a convoy escort fighter, ditching is a logical field of research.

But I spent more time with the aerodynamics experts than with anybody. They had been living with the project longest and their biggest concern was how the plane would perform in the air. They supervised all the wind tunnel tests, all the models. They worked out all the design changes that tests showed the plane would need. They knew structural limitations in terms of performance. They were looking at the plane as a total machine. And so was I. They had it all down on paper. I would have to prove it out.

The cockpit of an experimental plane is the test pilot's baby. A lot of my time went into learning about and helping plan how it should be designed and built. The position of a switch or a button could be of critical importance. If I couldn't reach a switch I needed, or see a gauge, it could mean failure of the flight program.

A test pilot's cockpit involves much more than the usual switches and gauges. It's filled with special equipment peculiar to the plane he's testing. Any experimental plane has three times the instrumentation of a production airplane. The XFY-1 has even more because it is intended to do something no other plane ever did.

The wings and fuselage of an experimental plane are always filled with special instruments to document flight in terms of temperatures, pressures, stresses, strains and vibration in every part of the plane, from the smallest to the largest.

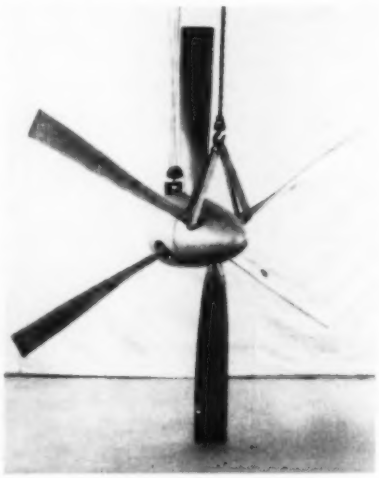
Such data goes to a photo panel remote from the cockpit. Some of it I don't have to worry about immediately, although switches that control recording cameras and oscillographs must be readily available in the cockpit. Cameras and oscillographs have tattle lights and jam lights. First impulse of the instrument man, who must contrive a way to notify me of malfunction in recording equipment, is to put a flashing red light on the instrument panel. But a red light is a panic light to a pilot, and I don't want that staring me in the face unless something is really wrong with the airplane. So we discuss how I'm to learn of a recording failure and we settle on something I'll see and can interpret without getting side-tracked from my prime business—that of flying the airplane.

Some of the strain and pressure gauges on the photo panel will show data that could be critical to the safe operation of the plane on its flight tests. These have to be repeated on any instrument panel so I can monitor them and forestall a possibly dangerous situation.

All this makes for panels and consoles no man could see by himself if he had four eyes. I've only got two, so the placing of the instruments and switches in the cockpit has to be planned for quick scanning and marked so that danger can be detected at a glance.

Emergency procedures are all spelled out in a production airplane. They've been tested and proven and the service pilot learns exactly what to do in emergency before he ever gets into the cockpit.

Not so with an experimental plane. We try to anticipate every emergency. It has to be figured out in advance, because a flight doesn't leave time for experiment. Suppose there's a power failure? What does that mean to control of the airplane? Does a power failure knock out the electrical system, the instruments, the hydraulic system and the controls? What can you do to get things going again? It all has to be figured out and planned for. The answers must be known before you leave the ground—through the experience of engineers and pilots concerned with flight tests on previous new airplanes.



Curtiss-Wright turbolectric prop used on XFY-1.

On a vertical rising aircraft, there are problems that do not come up on a conventional plane. The attitude of the plane in flight is normal, and so is the pilot's position. But in takeoff and landing, the pilot is in a radically new position—half on his back—and the problem of orientation is bigger than ever before. Reaching controls, and moving them when you're on your back, is a lot different in a vertical riser.

I don't think up the answers. The engineers and other test pilots spend hours hangar-flying the plane with me, and Shannon keeps a weather eye on how the planning is going. My job in this stage of the project is to integrate the data and ideas. The conclusions, however, are never entirely mine. They're a distillation of the experience and ideas of everybody.

The same procedure is used on planning the flight test program. It is primarily the job of the flight test engineer,

Controls engineer R. C. Ferguson (left) and W. M. Chatfield check scale model of a tethering rig designed to let the XFY-1 free wheel up, down and sideways inside a blimp hangar.

but the instrument analyst and I help. Again, it's a cooperative job, with the engineer leading.

The instrumentation has to fit the job. It has to record everything we want to know about the plane on its test flights, or there is no point in taking the plane off the ground.

The design, location and types of the instruments are the responsibility of the analyst, but their adequacy and effect are also the engineer's and test pilot's problems.

While all this hangar flying is going on, I keep my hand in on actual flying. I fly co-pilot on commercial and military versions of the Convair-Liner. I'm a pilot in Marine Reserve Fighter Squadron 241, and pile up plenty of time as a weekend warrior in both prop and jet fighters.

The XFY-1 has a turboprop engine. To get experience with that type of engine, I ran the test stand regularly for the R3Y, the new turboprop water-based transport Convair is building for the Navy. Later, when the engine stand for the XFY-1 was set up, I ran that.

But because the XFY-1 is a high speed fighter, I had to keep up my jet time. I flew the T-33 assigned to Convair as a trainer. With my Marine flying, I put in time on five different jet planes.

And because the VTO flies vertically, I had to keep up my helicopter time. Navy Helicopter Squadron One at Ream Field checked me out in six different kinds of helicopters. I never tried to learn any one kind too well. The idea was to feel out stability and control. When I learned how to fly one kind, I went on to another to learn to adjust to a different situation, learning to hover, take off and land.

Neither the jets nor the helicopters could answer one big question about the XFY-1 flight tests, though. The pilot was in the normal position in both jets and helicopters, although each duplicated something the XFY-1 was designed to do. The XFY-1 was going to be different because the pilot was on his back in take-off and landing.

The XFY-1 engine test stand was useful in answering that question. The cockpit in the stand duplicated the pilot position I needed and gave me a feel of the power the XFY-1 would have. The stand didn't fly, but I could pull it up about five feet from the ground with the props.

The dynamics and controls groups built a controls test stand for the XFY-1. It was primarily to work out design problems, but it was useful to me in learning the feel and response I could expect from the XFY-1. It duplicated the XFY-1 control system exactly.

The plane itself got far enough along eventually so I could try out the real cockpit, and I spent hours just sitting in it (on my back) trying to visualize what it would be like to fly the XFY-1.

I still don't know exactly, but a lot of the remaining questions will be answered during tethering tests. The XFY-1 doesn't have a normal landing gear. The "wheels" are big casters on the tips of the wings and vertical fins. The only normal ground position for the XFY-1 is on its tail.

The engineers designed a rig that will let me take the XFY-1 off the ground inside a blimp hangar. A cable runs from the nose of the plane to the hangar roof. Other cables are attached to the wing and fin tips. A series of manual and automatic controls will let me free-wheel the plane up and down and, to a limited extent, sideways. If trouble develops, the rig will catch the plane before it can be damaged.

The flight engineer, Bob McGeary, will operate the rig. He's also the only man besides me who will operate the plane. He'll do some of the ground engine runs and generally advise me on what to expect from the plane mechanically. He knows the working systems of the plane as well as the people who built or maintain them. And he can project his knowledge into how the systems will react under the forces and strains of actual flight. Bob also will be my ground contact on the first actual flight.

Once the free plane leaves the ground, though, it will be strictly up to me. The airplane is radical, but it's built to fly. I know it will. END

I learned about flying from that

(Continued from page 39)

aircraft were to be out of the air by dark. Anything flying thereafter was deemed to be hostile. I thought of the 50 calibers and 40 millimeters below waiting for some trigger-happy G.I. to set them off. And then, as I faced the fact that I must tie the stick back, take my rip-cord ring in hand and step out to probable injury and certainly courts martial—I was granted the second reprieve of the day. The clouds overhead broke for a moment and the wan light of the moon shone through, reflecting on the water of a crooked stream below. That creek had been in my flight pattern for days, and I could recognize it for it paralleled my landing strip.

Fighting panicky impulse to get down too fast, I cranked the stabilizer back and, keeping the stream in view, set up my landing pattern. I couldn't see the strip but I knew where it had to be. My approach must be just right, not too high and not too low, and straight down the middle between the fences. I could dimly see the outline of a large tree and houses which I knew to be on the opposite side of the runway from the stream.

For a moment I thought I was too high and fast but the *Cub* fell out, bounced, and veered to the side. Opposite brake brought it back, and the little plane skidded to a halt.

Bathed in perspiration, and with my knees shaking uncontrollably, I climbed out — as Sergeant Bruhn, my mechanic, and Corporal Mofford drove up in the jeep—its "cat-eyes" black-out lights glowing softly through the darkness.

"We thought you'd had it, Lieutenant," said the sergeant. "Div Arty just called a minute ago to see if we had a plane up. Thought they'd better check before they turned the ack-ack loose."

That night taught me a lesson I have never forgotten. Never be too proud or stubborn to turn back before it's too late. END

FLYING CALENDAR

June—International Tourist Plane Flight to Brazil. In commemoration of the Fourth Centennial of Sao Paulo, Brazil. Application deadline is May 20. Meeting in Sao Paulo from June 16 to 20. Contact: Office of the Air Attache, Brazilian Embassy, 3007 Whitehaven St., N.W., Washington, D. C.

June 5-12—Second Annual Transcontinental Air Cruise. From Philadelphia, Pa., to Palm Springs, Calif. Contact: Philadelphia Jay Cees, 17 & Sansom Sts., Philadelphia 23, Pa.

June 13—New England Soaring Meet, La Fleur Airport, Mass.

June 13—"Steak Flight" at Ranchaero Airport, Chico, Calif.

June 18—Royal Aero Club Trophy Race. An international handicap event over a 200 mile course open to any type of aircraft of any nationality, with maximum speed of at least 130 mph. Coventry Civic Aerodrome, Baginton, England. King's Cup Air Race is the following day.

July 2-5—Seventh Mid-West Soaring Contest, Municipal Airport, Toledo, O.

July 3-6—Annual All-Woman Transcontinental Air Race. Long Beach, Calif., to Knoxville, Tenn. Sponsored by The Ninety-Nines, Inc. All qualified women pilots welcome. Applications accepted May 1 to June 20. Contact: Mrs. Barbara London, 624 Armando Drive, Long Beach 7, Calif.

July 11-17—Philadelphia Glider Council Summer Training Camp, Philadelphia Gliderport, Pa.

July 21-August 5—World Gliding Championships, Camphill, England.

July 27-August 5—Twenty-first National Soaring Contest, Elsinore, Calif.

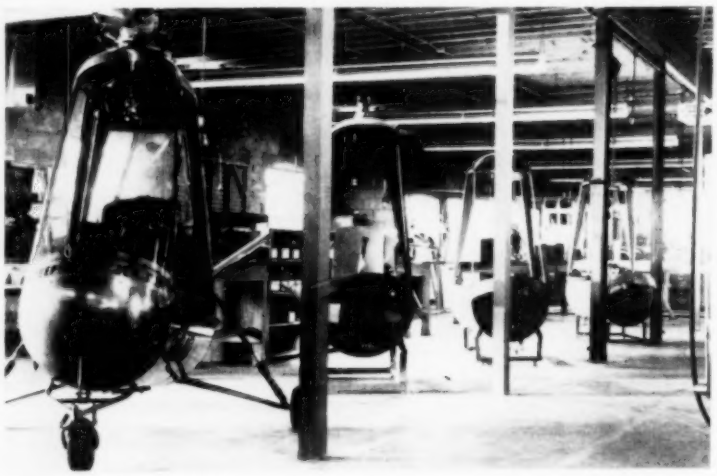
August 7-8—Fourth Annual National Air Pageant, Curtiss-Wright Airport, Milwaukee, Wisc.

August 7-8—Experimental Aircraft Association's Second Annual International Fly-In and Convention, Curtiss-Wright Airport, Milwaukee, Wisc. Contact: Paul H. Poberezny, 3801 South 56th St., Milwaukee.

Sept. 16-18—National Plowing Contest near Olney, Ill. Landing facilities nearby. See next item for contact.

Oct. 7—Farm Progress Show, near Camden, Ind. Landing facilities nearby. Contact: Flying Farmers, P. O. Box 6368, 42nd St. Station, Indianapolis 5, Ind.

Information for this column must be received at FLYING's editorial offices, 366 Madison Avenue, New York 17, N. Y., three months prior to the event.



Final assembly line at American Helicopter Manhattan Beach, Calif., plant showing four of five XH-26 *Jet Jeeps* being built for Air Force evaluation. Right: the pulse-jet propelled XH-26 is single-place, collapsible; can be parachuted in container.

FAIRCHILD BUYS AMERICAN

American Helicopter Company became a Division of Fairchild Engine and Airplane Corporation recently following a year of planning by Fairchild to enter the rotary-wing aircraft field. Main plant is at Manhattan Beach, Calif. Other plants of the new Fairchild Division are at Costa Mesa, Calif., and Mesa, Ariz. Development contract for the first service-type, single-place helicopter, the XH-26 *Jet Jeep* was awarded American in 1951. The company is also engaged in a number of other development programs in the field of rotary-wing tip-mounted power plants, light-weight rotor blades, stainless-steel honeycomb sandwich structures, and helicopter stability improvement.

Three-ton cargo helicopter in the preliminary design stage, uses tip-mounted, pulse jet power packages for propulsion. Project is under both Air Force and Army auspices.

Grandaddy of Jets

(Continued from page 22)

but even that had an unusual feature. The designer believed that by adopting a short undercarriage and keeping the lower wing close to the ground, he could create an air compression to cushion landing shock.

It would have been remarkable indeed if, with all these new ideas, the young inventor was satisfied with existing power plants, and he wasn't. No, he reasoned, a conventional engine wouldn't do. Why not use a turbine instead of a propeller, one which could be housed internally? Driven by an engine, this turbine would force air to the rear at great speed and thus propel the aircraft forward—jet propulsion.

So M. Coanda discarded the old screw propeller and substituted his turbine. This he housed in a cone-like nose section. The turbine was driven by a 50 hp, four-cylinder Clerget engine mounted behind it and connected to it by a drive shaft. The turbine was started by means of a tooth-wheel transmission. As it revolved, the turbine drove through the nose cone a column of air 20 inches at the entrance and about five feet at the rear of the cone. This novel means of propulsion delivered, according to M. Coanda, a thrust of 480 lbs.

The Coanda biplane, needless to say, was the subject of great speculation. There was general agreement that M. Henri Coanda was ingenious.

The idea of an all-wood covering was well received. The tail section too, while unique, did not seem impractical. The craft had exceptionally clean lines; the absence of superfluous struts and wires was quite pleasing. But the turbine . . .

On this point there was considerable scepticism. The inventor claimed a great wind velocity, but, the experts asked, does this necessarily mean thrust? And could a 50 hp engine deliver the power required to drive the turbine?

The Coanda machine had been constructed in secret. Tests were of inconclusive nature. More tests would be required to prove that the aircraft could fly, let alone that a turbine-driven machine could outperform existing propeller-driven craft.

So M. Coanda was pressed for further trials by aeronautical enthusiasts, but they were doomed to disappointment. Purportedly, Coanda's airplane underwent several flight tests at 112 kilometers (70 miles) an hour. But positive proof? It never came.

The following year, at the Rheims air meet, the dauntless Coanda turned up a new model of his aircraft, which set the crowd buzzing once more. Like the earlier model, the new Coanda had many unorthodox features but, alas, the turbine had been replaced by a four-bladed propeller.

What had become of the controversial turbine of the 1910 model? What had happened to his premature, shaky step into the age of jet propulsion? "Peut-être n'est ce qu'un beau rêve," suggested one observer—"perhaps the whole thing is nothing but a pleasant dream." END

What it takes... TO BUILD THIS TEAM

Today's most powerful deterrents against aggression are the airmen and officers of the Strategic Air Command and their global B-36's. No combination of men and machines – by their mere existence – has ever been such a force for peace!

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Briefings . . .

(Continued from page 41)

year, in a program developed by the CAA. Second place this year went to Kern River Flyers, Kernville, Calif.; third place to The Mountain Flying Club, Gunnison, Colo.

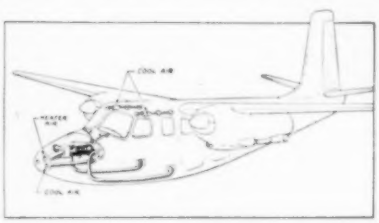
WEATHER briefings by television are being tested by the Air Force. The "weathervision" project may be an answer to the problem of supplying prompt weather information to pilots and operations officers at remote locations. Industrial-type TV is being used for the tests.

PRINCE BERNHARD of the Netherlands wound up his three-week whirlwind tour of American aircraft plants with a

visit to Republic Aviation Corp. The Prince, who is Inspector General of the Royal Dutch Air Force, was accompanied on his tour of the Farmingdale, L. I., plant by Mundy I. Peale, president of Republic.

BUSINESS Pilots Safety Bulletin is the name of a new publication of the Flight Safety Foundation. Published monthly, it deals exclusively with safety information directed toward the business pilot. Subscription rate is $25 yearly. Address of FSF is 471 Park Avenue, New York 22, N. Y.

NEW HEATING and ventilating system has been installed in the Aero *Commander*. The Janitrol S-25 combustion heater in the nose distributes warm air more evenly in the cabin, improves windshield defrosting. Fresh air intake through scoops above pilots' windows is ducted to six individual eyeball type vents at seat locations, increases summer comfort. Other individually-controlled fresh air vents are in lower forward cabin wall, as are vents in warm air system.



HOW TO determine ground elevation for landings can be a problem. J. H. Coffing has solved it with a simple gadget. Made of transparent plastic, his Ground Elevation Indicator is mounted

on a rubber washer cemented to the glass dial of any sensitive altimeter. Set to field elevation at takeoff, it can be changed in flight to known elevation of destination. Pilot reads off plastic dial for last thousand feet during landing. Price is $3.50. Available at Jarico & Associates, 101 Crawford St., Danville, Ill.

FUJI Heavy Industries of Tokyo will build Beechcraft T-34 *Mentor* military trainers under license for the National Safety Forces of Japan.

BLUEFIELD, W. Va., dedicated its new airport recently, completing the last link in a circle of airports in the State. The asphalt runway is 4,750 feet long.

Serving a metropolitan area of 400,000 population, the airport brings scheduled airline service by Piedmont to the County and provides a base for business and personal aircraft. Bluefield is the hub of the soft coal mining industry.

CESSNA has received a subcontract from Boeing-Wichita to build the horizontal stabilizer section of the B-52.

(Continued on page 62)

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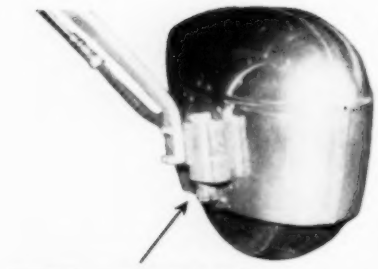

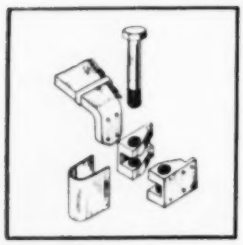

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MANUFACTURERS

Yak in the Sun

(Continued from page 18)

back. She was in fine fettle. Too fine for the mission we were saddled with.

We were at 4,000 feet when I saw the panels that marked the Bomb Line, the line inside which we dropped no bombs unless we were under Forward Air Control. Then we were over the front.

I picked up the *Mosquito*, a souped-up AT-6 that was our spotter, and directly underneath him saw the tank column we were supposed to support. The *Mosquito* went into a long, sharp dive. I heard Bill Schuman say, "He says he's got a road-block. Give it a squirt."

The *Mosquito* pulled up sharply to point out the road block he'd found. I saw Ross rock his wings, then pull up into a fast climb and roll over. He bore in fast, firing all the way. There was no flak. Ausman followed Ross and Dad was right on Ausman's tail. Still no flak.

But I decided to go in fast anyway. I added throttle and pulled up to start high, flicking on my sight at the top. I was at 280 when I smoothed out my approach. The road block grew big in my sight, but I waited. Maybe this was the day.

The road block was big now, clear in my sight. I squeezed, and the tracers drifted out in front of me. They centered squarely on the road block. Still no flak. By the time we'd joined up, the tank column had come up. I saw the lead tank sniff at the road block, then shift gears and go through. Nothing there at all. Tension crept down my back.

The *Mosquito* hovered over the tanks for a moment, then headed northwest. Ross broke to the northeast to stand off and take a looksee. Then Forward Air came in again. "He's got some ox carts heading north. Give 'em a whirl."

I cursed. The day was going sour all of a sudden. A dead road block and now ox carts. Ross and Ausman peeled off. I saw Dad lift his wing . . . then big orange balls of tracers were snapping across my left wing.

I yelled "Flak" and broke right.

In my haste somehow it came to me that an F-80 had uncovered a nest of anti-aircraft in this area just the day before. And now the AA was centering on me. But as I unwound from my turn, a shape hurtled by me and I knew I hadn't been in flak at all. I had been in the gunsight of an enemy fighter.

"Bandits," I screamed.

Like any good ex-*Thunderbolt* pilot, I shoved my throttle to the firewall and snapped into evasive action. When Dad heard my yell, he chopped throttle. I pulled away like he was standing still.

For the moment I was alone. I put my hand up to shade my eyes. The sky seemed empty. I rolled into a sharp left turn to close up on Dad, but by that time, he and the other element had found a bogie. They were far to my left. And the three of them were high-tailing it down a valley.

As they bored in, I saw that they'd bounced a *Yak*. At 7,000 lbs. maximum gross, the *Yak* is strictly a kite. It has the climbing and turning edge on every *Mustang* that ever pulled off an American strip. And the *Yak* that the boys were chasing was showing them how handy such turning radius can be. I nudged my throttle forward to get in on the kill. This could be what the whole day had been pointing to. But I never caught up with the other guys.

The voice of the *Mosquito* crackled into my headset. "Look out, No. 4, he's right on your tail."

I snapped my head around and saw the yellow winking lights of a *Yak's* two 12.7 mm. machine guns and 20 mm. cannon. He'd been sitting up there all this time in the sun and now I was directly in his line of fire. The turn sucked the blood from my head and for a moment I grayed out. I knew that the *Yak* could turn inside me, but in my panic, I held her there, hoping that somehow he wouldn't be able to follow through after his run.

And he wasn't. I rolled out to see that he'd gone across the top. And, taking advantage of his speed, he'd pulled up into a tight loop. That was all he needed. He was above me. He had altitude advantage. If he could come out of the loop right, he'd be perched on my tail again, only this time with speed to burn.

I swung sharp left to pass directly beneath him.

He must have been watching me because he kept his stick back too far and stalled out. He spun all the way down from 6,000 feet. I rolled back into a turn, hoping desperately to come out behind him. Actually, he was spinning down the axis of the circle I was making.

He recovered and I thought for a moment that I should try to tighten my turn and jump him while he was floundering out of his spin, but he snapped her over, nursed her back to flying speed and then—kite that the *Yak* is—he went into a climb.

This time he slacked off at the top of his loop and followed through gently.

So that was to be the pattern. I was flying a tight circle on the horizontal. He elected to fly his sparring circle on the vertical, snapping at me as we passed each other. We held our turns. I looked for a break and as he picked up speed, I saw that we were getting closer each time we closed on the south side of my circle. More and more rapidly the two planes got out of phase. I was able to kick my rudder and snap a shot at him each time now.

He saw it. He knew that after another pass I'd be coming in behind him as he began his climb. It unnerved him and he wobbled at the top of his next loop. I added throttle and waited him out. He fell unevenly this time. I cut wide briefly.

At the bottom, he recovered and began his pull-up but luckily my timing was good. I wrapped up my *Mustang* and while I was still in my turn began firing. I saw the tracers converge and pour into his wings. I eased rudder to the right to keep him in my sight. Then a puff of blue grew on his wing. He wobbled and fell out of his turn. Slowly he rolled over and went into a long glide.

I watched him go down. A *Yak*. A left-over from the last war just as I was. But the kill meant that now my wings stood for something. The old guy still knew how.

END

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Night Flying

(Continued from page 29)

The airplane rolled 300 feet before striking a fence. It didn't even nose over. Neither Duncan nor his passenger was scratched.

Nearly seven years of extensive night flying with only one forced landing due to engine trouble is strong evidence that the odds against any engine failure are high and the odds against *sudden* failure are astronomical. I've talked to pilots who said the engine quit without warning. But in almost every case, investigation has shown this isn't so. Usually the engine instruments are warning of difficulty for some time before the prop stops and the poor guy at the stick suspects something wrong.

The moral to this is that if you want to prevent engine problems, day or night, you've got to use your instruments. The pilot is like a doctor, who uses a stethoscope to check the condition of his patient. The pilot's patient is the powerplant, and it comes with stethoscope attached. Intelligent use of engine instruments can put surprise powerplant failures even further into the "highly improbable" column.

At this point, pilots such as the $27,000 plane owner lean forward and say nervously, "Yeah, but what if . . ."

Probably the best answer to this is found in CAA statistics. It's more difficult to find a good emergency field at night, but CAA records show that it isn't the rough terrain but the rough pilot who makes forced landings into unhappy statistics. The pilot who tries to stretch his glide is a culprit whether he spins in on a hill top or on a concrete runway.

Not that a forced landing has to be pretty to save the bacon! In 1949 less than one-third of the accidents in which the airplane was a total loss resulted in fatalities.

Pilots opposed to single engine night flying listen to the evidence on power plant failure, or more accurately, lack of failure, and frequently change the subject.

"Okay," they say, "so the modern lightplane engine is dependable. So the odds are that the pilot who watches his instruments can fly nights forever. But what about night navigation?"

The belief that night cross-country piloting requires eyes like a cat is widely held by a large number of pilots whose night flying has all been done in the hangar. It isn't a very valid argument against single engine night flying, because it would apply nearly as much to moving a B-29 from here to there. But whether you fly a multi or single engine airplane, you need to recognize only one fact in order to cut night navigation down to size: night navigation isn't difficult, *it's just different.*

During the day you navigate by what you see. Much of your navigation at night is based on what you don't see. Flying south from Chicago's lakefront airport after sundown, you don't really see the Illinois Central tracks. But that thin, unlighted line that runs between two brightly lighted areas makes a fine check point. Similarly, it's easy to tell whether you're over Chicago Heights or Park Forest, two neighboring Chicago suburbs. Chicago Heights is the older of the two. It has more trees. Chicago Heights lights, seen through the trees, appear to blink. Nearby Park Forest's lights, with no tree screen, shine steadily.

In some cases night navigation is considerably easier than day flying. At night every large town is a beacon, visible for miles. It takes a terrific amount of off-

TIPS ON NIGHT FLYING

1. When flying with portable parachute flares, always carry them within easy reach for, when you need them, you can't waste time searching the airplane for the gun and flares. Most flare guns have a hole provided in the handle for some reason. It is a good idea to tie a light rope through this eyelet in loop fashion long enough to reach around your wrist, for a flare gun kicks pretty hard when fired and that, combined with the slip-stream, might cause you to lose the gun on the first shot. Another thing, don't rest the shell across your arm when you fire, unless you want a bad burn.

2. In airplanes equipped with permanent flare installation, it's wise to get well acquainted with the flare switch box, how it opens, and the lineup of master switch locks and firing switches. It's a good idea to open the cover on the flare switch box when taking off and landing at night, for that is the time when, if needed, having the box already open might save your life.

3. A flash-light is a very valuable piece of night flying equipment. You can put a layer of ordinary masking tape over the lens to tone down the light, and it won't leave you blinded after you have used it. Leave the tape hanging loose over the edge of the light so that it may be easily removed in the event you may need the full power of the light for any reason. And remember, if your airplane is equipped with a cigar lighter, you can use it as a flash-light to a certain extent, for it will glow bright for several seconds when red hot, and the light won't blind you.

4. Glue small tabs of "scotch-lite" paper where the engine instruments rest in normal flight, so with the cabin fluorescent lights turned down low, you can read the panel at a glance. You can also arrange them where they appear to line up with the needles when looking from the pilot's side, so that you don't have to lean way over to line the needles up with the marks.

—John D. Pruett

course drift to pass by a town of 30,000 and not see and identify it. At night main highways are easy to distinguish from well-improved secondary roads that might, in the daytime, resemble principal routes. In the daytime ground traffic isn't as obvious as at night, when a long string of headlights identify the primary ground arteries.

Here the pilot who grounds himself at night is likely to squirm a bit and come up with the real reason many a competent pilot doesn't fly after sundown.

"At night," he admits a bit sheepishly, "my engine goes on automatic rough."

Pre-Solo Night Flights

It's to combat this bogie that we include night flying in our beginning flight course. Our students receive night check-outs, and take one three-hour night dual cross-country. In case anyone feels night landings and take-offs are difficult, he should consider the case of three of our students who hadn't soloed at the time they took their night pattern rides. Each of the three made better landings at night than they had been able to make in the daytime. The three agreed that all the necessary landing cues were present at night, without the distractions. And all three went on with new confidence to lick their landing problems and solo promptly in following day periods.

After thorough grounding in the principles of night flying, our students are frequently surprised to discover that many private pilots consider single engine night flying dangerous. One of them, Thomas E. Benner, a professor of education, made his first night cross-country just after he received his private license. Benner, who was in his late fifties at the time, has been flying nights ever since.

"One day a pilot at another airport expressed great surprise at my daring," Benner reported. "That was the first time I'd realized that many pilots think a simple thing like flying at night is so much more hazardous than daytime operations. None that I've talked to since could give me any logical reasons for feeling this way, so I fly nights and enjoy it."

Night Hazards Over-Estimated

If you're a private pilot whose reluctance to fly at night arises from the superstitions and half-truths that are found in too many operations offices, you owe it to yourself to do some independent investigating. Read the accident reports. Take some trips with an instructor or friend who is an experienced night flyer, who can give you a check-out on landings and take-offs and night navigation.

Then take a new look at this business of single-engine night flying.

When you do, I think you'll agree that we've made a mountain out of this night flying molehill. And I know your light-plane will run closer competition with your automobile in both pleasure and utility. END

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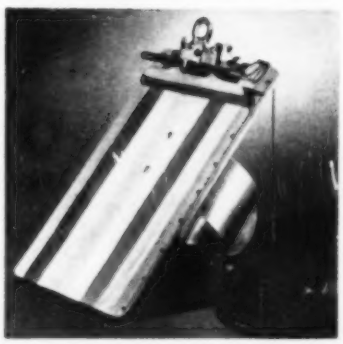

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   If 'yes' what are particulars _____
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On a business flight AOPA member 22553, William M. Rubin of New York, had trouble. His engine conked out. He tried for an emergency landing but couldn't make it. He hit a tree head on. The score: 10 broken ribs, skull fracture, plane demolished. CAA agents investigated. Report: no structural or mechanical failure. The case was closed. The pilot made arrangements for a DAMI to haul away wreckage in return for salvage.

The DAMI found basic design defects unnoticed by the original investigators. Through strong support from AOPA legal counsel and executives, Mr. Rubin and his attorney were able to reopen the case and establish that Mr. Rubin was entitled to recompense from the manufacturer.

In letters to the AOPA Mr. Rubin made these statements:

"It was only after I contacted the AOPA that the CAB reopened the case and then did a new report, and it was upon these findings that my action was started and successfully consummated through the good efforts of Mr. Harlow (Rubin's lawyer)."

". . . Without the help of the AOPA organization . . . I doubt that we should have been as successful as we were in the completion of this case."

An out of court settlement netted Mr. Rubin $16,666.67.

This is the kind of help AOPA is prepared to give its members at all times. AOPA services are potentially vast in value as compared to the modest membership fee. Enjoy . . . profit from AOPA's many membership benefits. Join Today!

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FLYING FARMERS

By BILL RENSHAW

EUROPEAN FLIGHT

Flying farmers seem to be just what the name implies wherever they may roam. On a recent trip to Europe, Robert Tracy, Janesville, Wis., leased a Cessna 170 in Switzerland, after which he flew down to the Spanish border, then back up the eastern side of France into the northern part of France. He was accompanied by Mrs. Tracy.

* * *

FF AND THE ARMED SERVICES

Flying farmer organizations hold an unusual appeal to many military men who love flying. This columnist has received hundreds of letters from Navy, Air Force, and Army pilots inquiring about affiliation with FF associations.

Latest inquiry comes from an Air Force Colonel who says he would like to become a flying farmer when he retires to his farm in Arkansas. We will be happy to send military men, who are farmers or who expect to become farmers, full information on both State and National Flying Farmer Associations. Those who can qualify for membership will be welcomed into the fold.

* * *

FF PHOTOG

It seems that most flying farmers have photography as a hobby. Don't ask "how come?" I don't know. I do know that stores have sold out of film every time a sizeable group of FF's spend a day in a town. Most return home with pictures for all kinds of farm gatherings. Some are so expert that they put on a full program. Many pay for films and travel costs by selling organizations an evening's program in what might well be termed a "package deal."

Typical is Guy A. DeNeal of Harrisburg, Ill. After a trip to Alaska, DeNeal built himself a lecture that has kept him "on the go" for the past year. He reports that income from his lectures has kept two sons in college.

* * *

CORN PICKING CONTEST

Big plans are underway for the 1954 National Mechanical Corn Picking Contest, which will be held on The Tracy and Son Farm near Janesville, Wis. The national event will be staged October 16th, with the Wisconsin State Contest a day earlier on the same farm.

Flying farmers who visit either the state or national contest will land on The Tracy Farm which has its own well-laid-out strips.

* * *

"OPERATION GOOD NEIGHBOR"

Flying farmers of Illinois and Indiana are looking forward to entertaining scores of FF's in their homes this fall. Occasions will be the National Plowing Contest to be held near Olney, Ill., and the Farm Progress Show to be held near Camden, Ind. Inasmuch as housing will be in tight supply, Midwest FF's within a 150-mile radius will open their landing strips and their homes to brother flyers from afar.

All flying farmers from states other than Illinois and Indiana are urged to write Flying Farmers, P. O. Box 6368, 42nd Street Station, Indianapolis 5, Ind., for assignment to a flying farmer's home. No less than 300 flying farmers are expected to open their homes to the overnight guests. To the extent possible guests will be quartered in homes on their line of flight. All homes will be assigned in advance, with guests and hosts getting together at the events. This will enable host FF's to guide guests to their strips. A minimum of 500 airplanes are expected at each event. A concerted effort will be made to have each state in the nation represented.

Adequate landing and take-off facilities are being readied near the site of each event. Dates are Sept. 16, 17 & 18 for the National Plowing Contest, with the Farm Progress Show scheduled for October 7th.

All known flying farmers in the nation will receive an invitation through one source or another, as will flying farmers in Mexico and Canada. Unofficially the project is being dubbed "Operation Good Neighbor." Flying farmers planning to attend either or both of these big shows are urged to get their "names in the pot" as early as possible.

* * *

"THE FLYING ROUSCHS"

Death, as it must to all men, came recently to Mrs. Selena Rousch. Mother of three sons, all aviation pioneers, Mrs. Rousch died at 86, much as she had lived —venturesome and unafraid.

Had she been fearful, her sons might never have written their names in the annals of aviation. Usher, her oldest, was the first to fly. After spending most of a year building a "flying machine" in his mother's barn, Usher wheeled it out one bright morning and, after several attempts, got his machine in the air and made it fly. Thus was started a long line of aviation's firsts, by Usher and his younger brothers, Carl and Charles.

When Mrs. Rousch was 79, she flew with a neighbor to the first Flying Farmer Field Day. On that occasion this columnist, privileged to interview her on a radio network, asked if she feared for her son on that first attempt at flight. Mrs. Rousch answered with a scornful, "No, of course not." Then, with a sparkle in her eyes that belied her age, she added, "Of course, I never expected him to get off the ground."

The fact that aviation enacted a heavy toll on her family never embittered her. Always she gave of her "spunk" to her lads who loved flying so much. Even after the last of her sons exchanged his log book for a passport in the skies, Mrs. Rousch continued to keep freshly painted the big sign on the barn roof that read—"The Flying Rouschs."

Now that the last of the Flying Rouschs has departed skyward, the big sign on the home barn is no more. Perhaps it is being transferred to another realm.

Be that the case or not, our faith tells us that the four clear-eyed "Flying Rouschs", to whom flying was like a breath of Heaven, are having a great reunion in a land where all landings are "happy ones".

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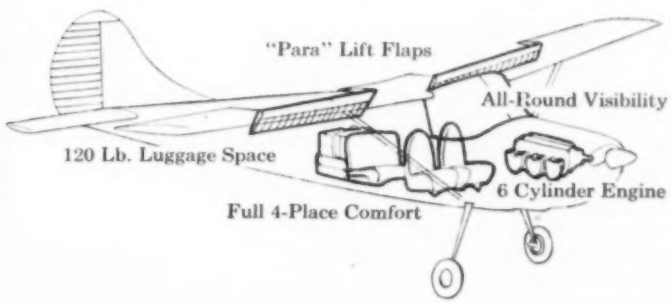

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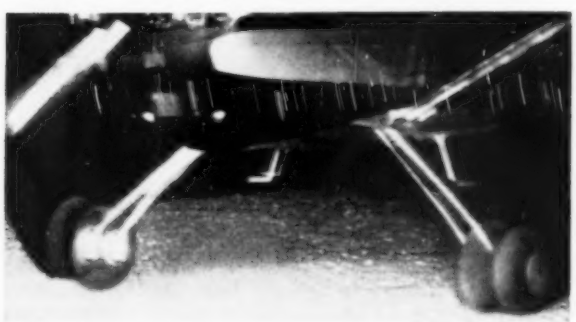

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Rebirth of German Aviation

(Continued from page 26)

panies, especially Aero-Lloyd and Junkers-Luftverkehrs, the famous Lufthansa was founded in 1926. The Lufthansa developed German long-distance routes to the Southern Hemisphere and made the first pioneer flight across the South Atlantic in 1928 with the flying boat from which was later developed the celebrated DO-X. It made the first flight to the Far East in 1937.

In 1932, the Ju-52 was introduced, capable of 150 mph. This Junkers plane became the old faithful of the Lufthansa and remained in service till the end. It was soon joined by the single-engine Heinkel 70 *Express*, the double Diesel-engined Ju-86 and Heinkel 111, and later the four-engined Ju-90 and Focke-Wulf 200 *Condor* types.

When the war began, the Lufthansa was used partially for German Transport Command duties. Some of its captains were called into the Luftwaffe and both international and domestic civil flying had to be almost completely abandoned. After the war, German airports were taken over by the Occupying Powers and production factories were dismantled. Many of the former airfields had been recognizably blasted in our air raids or later, through intentional demolition. Others were useless because their pre-war dimensions were inadequate for post-war international aviation.

The Allied Powers repaired or built entirely new airports for their own purposes and subsequently helped to finance reconstruction undertaken by German local municipal authority. From 1948 onwards, these airports have been reverting to German administration; for example the RAF airports of Hamburg and Düsseldorf, besides the Frankfurt and Munich ports in the U.S. Zone.

This increasing responsibility in aviation administration has given the Germans a chance to "try their wings" before actually using them. The Federal Government appointed a committee to prepare the way for the new civil flying company. Headed by Dr. Kurt Weigelt, who was last Board Chairman of the former Lufthansa, the committee included representatives of the Transport and Finance Ministries and of the Provinces of North-Rhine/Westphalia and Hesse, since, in those territories, the leading airports of Western Germany are situated.

A minimum sum equal to six million dollars has been provided for the building of a German aviation company. The Federal Republic contributes up to 90 per cent and the rest is to come from North-Rhine / Westphalia, the German Federal Railways and from private interests.

So far, the Federal Republic has set aside about one-third of its calculated share for this purpose, in the Federal Budget. The Minister of Transport, Dr. Hans-Christoph Seebohm, wants the money to come from German sources only and hopes to avoid a financial tie-up with foreign airlines. In this way, the German Air company would remain competitively independent of overseas groups.

MIDGET GLIDER

Believed to be the smallest flying machine in the world today, the 86-pound "Midget Glider," is flown here by Igor B. Bensen, president of Bensen Aircraft Corp., at Raleigh-Durham Airport, N. C. The helicopter-like machine has no engine and is towed in the air by a car or boat. Designed primarily for pilot training and sport flying, the machine lifts three times its own weight. It flies as low as 19 knots per hour and can make spot landings like a helicopter in auto-rotation.

The resultant organization is the Aktiengesellschaft fur Luftverkehrsbedarf (Joint Stock Company for Air Traffic Supply), known more briefly as LUFTAG, which was incorporated in the first week of 1953, with its HQ in Cologne under Director Bongers, and Technical Chief Hoeltje.

How much capital the new German company will eventually require must depend on its future activities. Certainly these are expected to extend beyond the borders of Western Germany. With the big German cities situated relatively near one another, flying might have little advantage over rail services, when account is taken also of the proportionally long dispatching time nowadays before each flight.

So proposals have been worked out in various quarters for an internal air-system based upon the experiences of the American Air Coach and the British and Belgian helicopter services. To make an internal system profitable, new ways must be found and the helicopter seems to provide the best answer at the moment. Meanwhile, airports in good condition are now available at Bremen, Nuremberg, Frankfurt, Stuttgart and Munich in the U.S. Zone and at Hamburg, Düsseldorf, Cologne and Hanover in the U.K. Zone.

Germany's central European position, certainly suits it to an inter-continental scale of enterprise. The grapevine has it that the former Lufthansa network would be revived, which means the traditional pre-war runs to America, Africa and S.E. Asia, but regular services will depend on its later financial position.

The problem of planes is a further headache for German civil aviation. With no aircraft industry of its own, all planes and parts must come from abroad. At first it was expected that lack of dollars would force Germany to purchase the necessary aircraft mainly outside the

U.S.A., for example, in Sweden and Great Britain. That Britain certainly reckoned on the possibility could have been inferred from the "propaganda" visit a year ago, of the Vickers-Armstrong *Viscount* to Germany. Moreover, according to a statement in the London Press, British as well as American firms offered the Federal Republic aircraft and engine parts to a total value of sixty million dollars. To the general surprise, however, the first order went out for four Convair 340's and four *Super-Constellations.*

Western Germany is also thinking about the possibility of producing modern types of the best foreign aircraft under license, since she cannot think of developing her own types while research opportunities are at their present low level. In this respect, Western Germany suffered a considerable loss with the eastward exodus of some of her leading brains after the war. Aircraft design experts, manufacturers and equipment were snapped up without delay by the Russians, with their Eastern Zone occupation.

All the same, the skeleton of a German aircraft industry is in formation. In Kassel, for example, the Junkers works have been founded afresh on a small scale. Messerschmitt has been negotiating with the authorities of Essen to take over the old Krupp works and build factories for aircraft parts, while Focke-Wulf, in the meantime, is engaged in glider production at Bremen.

But there are still other difficulties for revived German aviation. Scarcity of trained personnel, for example. There has been no civil flying for them since 1945, so the present number of technicians is insufficient. This applies equally to the flying men themselves. The original Lufthansa pilots are now mostly over age and scattered all about Germany. But these problems are being steadily overcome in various ways.

The original need has been calculated for about 100 pilots, whose training will take three years. A few are to be trained during employment by Swissair and will serve under contract for two or three years in Switzerland, whose own civil aviation is about to undergo considerable expansion. Three months basic training will be followed by service as second pilots and, on the termination of their contracts, they will be available to Germany, whose commercial aviation anyway is not expected to take less than four years to develop. A few weeks ago, a group of former pilots was sent to Britain for training and others are being recruited from among the younger transport pilots of the former German Air Force. Another source of skilled men are the foreign airlines now operating in Germany which will probably reduce their staffs after the founding of the new German company, thereby providing additional ground personnel.

Where this new Lufthansa should have its headquarters was a warmly contested issue. The U.S. Occupation headquarters city, Frankfurt, started a favorite in the stakes, with its central German situation and its excellently equipped Rhein/Main airport. But Cologne was a firm rival because of its airfield in the important Rhineland, and the Joint Stock Company's offices there would accordingly be near at hand. Munich, too, advanced reasons why it should be selected but Hamburg, in the British Zone, seems to have left them all at the post, and giant hangars are already under construction.

In the planning of routes, not only the question of commercial profit but also the interest of Germany's export economy have to be taken into consideration. Air Mail and air freight service are to be included besides passengers. But it is the passenger tourist traffic which will play one of the most vital roles of German aviation in the export drive, not simply through the foreign income derived from the flights, but through the stimulus they will give to the tourist industry.

With all these official and semi-official groups interested directly in German civil aviation, not to mention financial assistance and supervision by provincial and central governments, the embryo company looks at first sight as though it will be born in a strait jacket. The intention, however, is to give it as wide a measure of freedom in enterprise as possible. Governmental action is simply inevitable in the beginning due to the

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present circumstances of Germany's political position.

There are various legal matters, which cannot be settled on anything less than a national level, before Germany can finally take its place in world aviation. The Federal Republic would have to abide by the rules of the Chicago Convention of International Aviation of 1944. The former German Air Transport Code must be brought into line with ICAO regulations, although Germany cannot join this international organization . . . while she is not a member of UNO. At the last IATA conference in Montreal, Sir William Hildred anticipated that the necessary legislation will be passed.

Meanwhile, the way is being prepared for a new Lufthansa to take over a substantial part of the air services at present operated throughout the territory by a score of foreign companies. When the go-ahead is given, Western Germany will be quickly off the mark and into the air once again, under its own power. END

Man with a Hammer

(Continued from page 31)

with care.

"No flying field is any better than the folks who fly out of it," Joe says. "I'm proud of the guys who use mine."

He should be. He has a Flying Tiger Airline captain, an Eastern Airlines captain, the president of a chemical company, the owner of a machine company, an executive in a frame and alignment company, the owner of a crop-dusting company, the owner of a feed business—and a group of men who hold steady, responsible jobs. His clients come from an area within 25 miles of his field and he has been getting requests for hangar space from people who live in New York City, 60 miles away. They feel, he says, that they get a certain amount of pleasure out of the drive through the country, and out of the setting of the field.

The setting of the field is certainly tops. It's in rolling farm land in a broad valley between mountains. There is no industrial haze, no worrisome big-plane traffic, no sound, in summer, except the birds and the insects in the grass. The field is kept clipped neatly at all times, and is underlaid with tough smooth shale. It is possible to land on the field immediately after a gully-washer without bogging down or leaving ruts on the quick-draining sod. Nicest part of the field is its length; 3,000-foot main runway, plus two auxiliary runways of 1,600-feet and 2,200-feet each (used perhaps 10 per cent of the time). There are no wires, trees, houses or obstructions off the ends of the runways and, should you lose power on take-off, there'd be no sweat. You could go into any one of half a dozen smooth emergency fields once you were past the point of no return.

Now then, how can Joe Schwanda's example be followed by other folks who happen to have a big roomy farm and plenty of willingness to work? What are the economics? How long does it take? What sort of return can be expected on the investment?

The answers, of course, depend on how resourceful you are, and what your particular situation involves. When Joe Schwanda's 8-plane hangar blew flat in 1950, he painstakingly salvaged such timbers as weren't damaged, then tore down an old barn for most of the rest. He was strictly working on a shoe string—but he had rebuilt the hangar by early next spring, working straight through the winter.

"You don't know what it can be," Joe says now, "until you've got your legs wrapped around a truss up there on a morning when it's five below—and you happen to bang your thumb with a hammer . . ."

Joe used galvanized steel for the roof of his big hangar, but since then has shifted to aluminum. Aluminum, when put on carefully with aluminum nails, is virtually a life-time proposition—well worth its extra cost. Experience building the big 8-plane and 5-plane hangars has convinced Joe that they are just too much for one man to try—over a long haul. The trusses are too heavy. The spans are too great. The doors are too hard to open and close, particularly in winter. And—most important—it's murder trying to pull a plane out of the back for somebody who wants to take a short pleasure hop. You have to move all the planes in the entire hangar. Not that Joe objects. He's there to give service. He'll gladly pull a plane out if an owner asks for it—but he's simplifying the operation henceforth by standardizing on 2-plane hangars.

The present size of his three 2-plane hangars was arrived at after many years of experience, and Joe considers it the best. They are 42 feet wide by 32 feet deep. The roof is supported by A-trusses on 12-foot centers. Joe raised the trusses himself, with a gin pole. His father and son held the trusses steady from opposite sides, with guy ropes, during the process. The trusses were then bolted to the frame of the building with knee-brace bolts, the cross-studs fitted, and the aluminum roof nailed in place with aluminum nails. The footings are 8 inches wide by 30 inches deep, poured with 1, 2, 4 concrete (1 part cement, 2 parts sand, 4 parts gravel).

Costs:

Aluminum roofing, plus nails	$ 425.
Two coats of paint	30.
Concrete	40.
Steel nails, fittings	40.
Timber (first run fir)	$1465.
Total	$2000.

Joe gets $360 a year in rentals, at $15 a month, from the two planes using such a hangar—a return investment of 18 per cent. When you realize that most investments pay 5 or 6 per cent, you see that Joe isn't doing so badly.

At his present stage of development, Joe receives $300 a month from his hangars, and he feels he is about half way down the road. He plans to double his hangar capacity, building one 2-plane hangar a year. In 1955, he intends to add a maintenance shop, on the other side of the field, to minimize fire hazards. Joe has it figured that one man alone, working hard every day, could put up a good 2-plane hangar in two months. Two men could do it in one month. Joe's son, Don,

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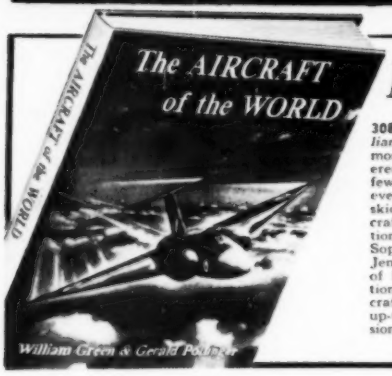

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is now a strapping 16-year-old, and Joe counts him as a man, as far as hangar construction goes. He has had his student permit since his 16th birthday, and plans to go up for his private ticket.

Don has ideas of his own for expanding the usefulness of their set-up. He has his eye on A-and-E work. Don figures that he can get an A-and-E license himself and apply the same philosophy to repairs that his father has applied to rentals.

The Schwandas feel strongly that greed and laziness have hurt aviation. Some jobs an A-and-E does are worth $3 an hour—and for those the A-and-E should be paid $3 an hour. But if you're tearing a plane apart, for example, all you need is care and patience . . . and almost anyone with sense can do it. Don feels there is room for an A-and-E who isn't afraid to sweat, and who will give his clients a break. The sticklers for every penny . . . the guys who present the ordinary lightplane owner with staggering bills—are simply killing the goose that lays the golden egg.

"We'll do it right, and we'll do it reasonable," Joe says. "We don't lack for customers."

The beauty of the Schwanda airport is, of course, low overhead, and personal labor. The way they do it, it's not hard to take at all. As a matter of fact, Joe says, it's real satisfying to get out there on a summer morning and hammer nails into a new project. It keeps you fit, you don't have to punch a time clock, and there's no pressure. When a client comes out to fly, you can lay aside your hammer, shoot the breeze with him while you help get his plane out, and enjoy life. The only cash outlay of any size is taxes (moderate) and liability and property damage which Joe carries on his two J-3 *Cubs* used for student instruction, rental and occasional charter. He does not carry fire or wind insurance on his hangars. Instead, he watches them with an eagle eye.

Joe's 16-year-old son, Don, plans to be A & E.

Joe says anyone can do what he has done. It doesn't take a terrific manual skill or background in construction work (although you have to do it right!) If you want to learn the practical rudiments of carpentry, roofing, or masonry, you can buy how-to-do-it books very reasonably on these subjects, complete with explanatory diagrams. A chat with a local building contractor will then fill in such technical gaps as may still be bothering you, and you are ready to figure your materials, and start your hangar. Joe did it this way and had no trouble at all. He'll be glad to answer any questions from folks who may want to follow his lead. His address is Hackettstown Flying Service, Hackettstown, N. J.

If the nation had 10,000 guys just like him, lightplane aviation would be zooming. How about it? Own a farm? END

Next Step in Navigation

(Continued from page 17)

observed that air navigation was a trial and error affair. Pilots flew with navigational systems which permitted substantial error to occur. They relied upon some additional method for determining this error and correcting their track. Celestial navigation is that sort of aid.

Actually, it is more a system of detection than navigation because it gives the pilot a means of finding out where he is, or was, at any moment. So he flies from one known fix to another but may meander in between. His method of navigation is only as good as his method for getting fixes and this may fail completely in adverse weather.

With development of radio transmission, airborne navigation began to take on a different complexion. Now, fixes could be obtained at speeds commensurate with the increasing velocities of air travel. And, new techniques were uncovered which began to approach the continuous form of informational flow which appears to be the ultimate. Speeding at 186,000 miles a second, radio waves are an instantaneous messenger.

Probably the first elaborate navigational system growing out of radio transmission was the 4-course radio range. This method involves extensive ground facilities in the form of two transmitters and five high antenna towers. These are established at key airports and emit four radio beams to guide flight along airways. Beam transmission is on low and medium frequencies, between 200 and 400 kc. By listening to an "on course" signal, a pilot can fly along a beam to the station. Fan markers and cones of silence are auditory signals which indicate when the aircraft approaches and is actually over a station.

Although 4-course radio ranges serve an extremely useful purpose, they have several inherent weaknesses. They provide guidance only to those locations which are equipped with extensive ground facilities. Only four courses are provided to each station and off-course guidance is ambiguous. At low and medium frequencies, radio reception is susceptible to static and can become completely unreliable during electrical storms when it is most needed. At best, 4-course radio range permits an uncertainty in position which requires a complicated and time-consuming flight pattern to check.

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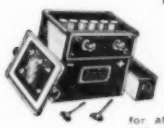

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To overcome these objections, the present system of VHF Omnirange has been adopted. This equipment projects an infinite number of radial ranges in all directions so that an aircraft can be guided to the station from any direction. The ground facility is simple, involving a single antenna structure. Transmission has been switched to relatively static-free VHF frequencies, in the 108 to 118 mc. band, which are dependable under all atmospheric conditions. Also a greater number of channels are available at these higher frequencies.

VHF transmission is similar to that used in television in that the transmission is straight-line and does not follow the earth's curvature. The distance at which the signal can be received depends upon the altitude of the aircraft.

With the VHF Omnirange (VOR) Stations, a companion facility is being installed. This is Distance Measuring Equipment (DME). Motorists jogging along highways in their $2000 automobiles have an advantage which pilots of half-million dollar aircraft are denied. With their accurate speedometers, they know how fast they are going and how far they have traveled. The airborne pilot has had to depend upon his airspeed indicator which tells him only how fast he is going relative to the air around him. While helpful, this instrument does not give him the necessary data concerning his ground speed or distance traveled.

DME is an electronic speedometer which gives the pilot his speed relative to the ground and his distance to or from a point on the ground—usually a VOR station. It employs a receiver-transmitter combination in the aircraft which operates at about 1000 mc. in the ultra high radio-frequency band. The airborne equipment, called the "interrogator," sends out a pair of radio pulses which are received by the ground facility, called the "Transponder." The Transponder replies with another pair of pulses which are received and analyzed in the aircraft. The elapsed time between transmission and reception of the pulses and the change in the elapsed time as the plane travels is electronically computed and translated into both miles and mph and presented to the pilot by a direct-reading instrument. This is a line-of-sight type equipment.

Although there are a limited number of VOR/DME stations, their usefulness is greatly increased by an ingenious device. Called a "Course Line Computer," this instrument makes it possible to fly to any destination within reception range of a VOR/DME station. The pilot simply sets certain navigational data into the computer. By electronic means, the computer analyzes the information received from the VOR/DME station and translates it into data which guides the pilot to the desired destination, just as if the VOR/DME facilities were magically transported to this point.

Recently a number of computers have been developed which pictorially present VOR/DME information to the pilot. These usually show a small airplane,

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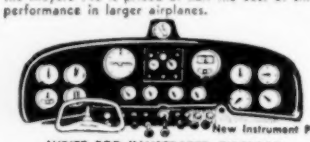

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which represents the navigating aircraft, projected on the surface of a map or chart. Progress is simulated by the automatic movement of the replica aircraft over the map. The pilot may simply watch this movement to determine his progress along the desired course. To date, these systems have tended to be bulky.

During World War II, several methods for determining position in flight were developed and used. Two of these are Loran and Shoran, used for long or short range navigation, respectively. In these systems, a special receiver in the aircraft analyzes the relative times of arrival of synchronized pulses from established and coordinated ground stations. This information is used in conjunction with a special map, with grid coordinates, to determine the plane's location. Loran, which utilizes medium radio frequencies, is subject to static and weather interference. Shoran, using VHF bands, does not reach to the extended distances available to Loran users.

Another very useful navigational aid is the Automatic Direction Finder. This device employs a loop antenna which is automatically rotated. With it, the pilot can tune in any standard broadcast, between 550 and 1600 kc, and home on the station. By picking up bearings to two stations, he can plot his position with little difficulty. When homing with ADF, a pilot's course usually results in a curved track toward the transmitter rather than a straight line because of the effect of winds.

All of these systems of navigation, from pilotage to Omnirange, are useful. Strangely enough, as each new development has come along, it has usually not caused the discard of previous methods but has been added to them. For example, many pilots are flying by means of all of these methods today. Each type of aircraft and aircraft use employs those systems which best lend themselves to the particular flight requirements. Using the finest equipment available, U. S. commercial airlines completed 96 per cent of their flights last winter. Bad weather and mechanical troubles caused the four per cent cancellation and this figure is now approaching an irreducible minimum.

But something more is needed and must be developed to meet global military requirements. As pointed out, dead reckoning and celestial navigation are not sufficient. Radio ranges, distance measuring equipment, Loran, Shoran and Automatic Direction Finders depend up-

(Continued on next page)

Briefings . . .

(Continued from page 46)

BEHAVING like a jet, a Capital Airlines Constellation set an unofficial record for the Cleveland-New York run when it flew the 418 miles in one hour nine minutes. The pilot, Capt. W. J. Hull, stated "there can be little doubt we were in the base of a winter jet stream because over much of the route we had a tail wind of 170 mph." In level flight at one point the ship did 474 mph and, when beginning its descent, clocked off a ground speed of 502 mph.

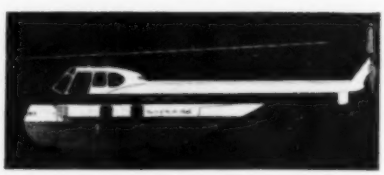
SUITABLE for installation on all types of aircraft from small single engine planes to largest commercial or military types, the new Lear VHF Broad Band

Communications Antenna may be used with all makes of aircraft VHF equipment. Made of aluminum casting, it weighs one pound 11 ounces, mounts externally on skin of the aircraft.

CHICAGO's Midway Airport held its position in 1953 for the second straight year as busiest airport, according to CAA's traffic control figures. The other nine of the top ten busiest airports in terms of total traffic: Miami, Los Angeles, Cleveland, Wichita, Atlanta, New York (LaGuardia), Denver, Dallas and Teterboro.

COMMERCIAL pilot written examinations have been revised into a more practical form, simulating the actual problems encountered on a typical cross-country flight. New exam must be taken all at one sitting, requires approximately five hours.

MOHAWK AIRLINES, serving 24 communities at 15 airports between New York, Buffalo and Boston, has purchased



a Sikorsky S-55 helicopter for passenger service on its routes, starting early this summer. Mohawk will be the first local service airline to offer helicopter passenger schedules.

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on ground facilities which cannot be relied upon for global military use.

Another system suggests itself—radar. Radar systems can be entirely airborne. Holding out great promise as a result of its wartime use, radar has not completely fulfilled that hope as far as known navigational equipment is concerned. Radar mapping equipment is relatively heavy and its effectiveness depends upon the power, and weight, of the transmitter. It is useful over coastlines and other terrain where marked topographic features are discernible. Over water and flat plains, or other similarly featureless areas, radar mapping facilities are almost useless.

The global military navigator, requires a system which will provide the benefits of VOR/DME without reliance upon ground facilities. This sounds like an almost impossible problem but present electronics advances are giving this dream a semblance of reality.

With today's flight speeds, and those being designed into new aircraft, the modern pilot cannot be content with any method of navigation which depends upon periodic fixes or requires substantial time to obtain data. Flying over long ranges at high speeds, he cannot afford to deviate from his desired course.

The ideal military system, then, will be that which gives the pilot a continuous, visual indication which tells him three things: (1) that he is successfully making his desired track, (2) how far he has progressed in ground miles, and (3) his present position. It would be helpful, but not essential, to also know his ground speed. All this data must be provided from a self-contained system which comes within practical size and weight limitations. END

Cornered

(Continued from page 30)

came the realization that I had waited too long to turn back and that the C-45 could not climb high enough to get over the clouds.

I reasoned that it would be at least an hour's flying in the soup if we went back the way we had come. We were not over 30 minutes out of Tallahassee and, since we had to fly in the clouds, it would be better to go in that direction I turned and again headed toward Tallahassee. As soon as we entered the clouds, the ship started bouncing. I began a letdown. The compass spun as much as 30° off heading on some bounces. I let down to 6,000 and was hoping we could get below the clouds without running into worse trouble. Then we hit it.

It was impossible to see out of the windows. The first indication of the thunderstorm was a shuddering of the plane. For a second, it seemed as if the ship stopped and we strained forward against our safety belts. Then the plane shook and dropped sharply and the instruments spun. The altimeter flicked downward 400 feet and the compass continuously spun. The ball in the turn and bank indicator rolled from side to side and the needle swung back and forth. Somehow, I fought the ship back onto an approximate heading by using directional gyro. I had reduced power and air speed. We were pitching and rolling at the same time and, when I pulled the wheel back to stop the nose from going down, there would be long seconds when nothing happened, then the controls seemed to act all at once and we would nose violently up.

Suddenly the clouds lit up with a cold white light more intense than sunlight, as lightning slashed across us. We were almost blinded. I could barely see the instruments. I turned on the instrument lights. One flash had not gone before the next one came, one after the other, until it was a continuous white light with jagged fingers of fire on every side. The altimeter flickered up and down two and three hundred feet at a time. Suddenly, the directional gyro began spinning and I realized that we might be upside down since it will not tumble and spin at less than a 55° bank. I concentrated on flying needle, ball and airspeed and we lost 1,500 feet before I got the ship upright. We were then down to 4,000 and I knew that we had to get out of there soon or the wings would be torn off.

It seemed like hours later through endless sickening drops and bounces and weird flashes of lightning before we fell out of the bottom of the clouds at 800 feet and could see the ground. We were still in the storm but the pitching and rolling lessened. I again tried to contact Tallahassee and was successful, although the static was bad. We were less than 15 minutes away. There was a light shower over the field when we came in but, compared to what we had come through, it looked like fair weather. We were a happy bunch when our wheels hit the runway.

Scattered thunderstorms, under certain conditions, can become a mass of thunderstorm covering several states in a few hours. If there is any doubt about weather, keep a listening watch on the radio and get the forecasts every half hour. Do not let confidence exceed ability, thus waiting until it is too late to turn back. END

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Letter to a fledgling

(Continued from page 35)

If the engine has been out in the weather with no attempt made to prepare it for storage, to run it occasionally or even turn it over, it will certainly need a "top" to restore its original performance.

From the standpoint of time and expense, this "top" will be the least of your worries. It consists of removing the carbon from pistons and heads and "busting" the glaze in the cylinders. New rings are installed. Valves and seats are ground and lapped. This machine work should not run over $12. Rings will run between $5 and $10 and new gaskets will cost another $3. I would also figure on disassembling the mags and carburetor for inspection.

The propeller is next, from the standpoint of cost. If the finish is shot, the prop will certainly be out of balance. Balance and varnish will cost about $15, but if the fabric is torn at the tips or the metal leading edge is severely dented or loose, the cost of repair will approach that of a good used prop. And if you discover separated laminations, or a good sized chunk of wood gone anywhere, you should figure on replacement. Props list for over $65 but you can usually pick one up from "surplus" or "bankrupt" stocks at up to 50 per cent off. If the ship is equipped with a metal prop, your troubles are less.

The windshield is important as, next to the prop, it is the most expensive single unit on the aircraft (subject to deterioration). They list for $37 to $45 and none are available anywhere for less than $35. Scratches can be polished out but you'd better figure on replacing it if you find extensive checks beneath the surface, discoloration, or cracking around the lower edge or at the corners near the wing root.

Your next consideration should be for the extent of corrosion to the aluminum alloy parts. I've never seen it so bad the skin had to be replaced but it could easily be your most serious problem. Several outfits put out an acid wash which is a great help in removing corrosion. However, such "washes" do not work alone but only in conjunction with plenty of elbow grease and a soft brass brush. This stuff costs around $4. a gallon.

The ship will, of course, require a paint job when you have finished the etching process, which runs into money for primer, enamel, thinner and the rental of spray equipment. But your painted ship will be easier to keep clean and polished, and your corrosion problem is over.

Tires are subject to only superficial deterioration. Look for broken cords, evidenced by a bulge in the sidewall as you roll the ship forward and back, deep stone cuts, or tread worn down to the fabric. Any of these is cause for rejection.

Don't let signs of a little damage to a plane frighten you off. It's often easier and cheaper to repair a ship that's been in a minor accident but is otherwise clean, than to restore one deteriorated by weather.

Check the panel for missing instruments, which will cost you about $15 apiece to replace.

The final important point to figure out before you get into this deal is where you are going to keep the ship while this work is accomplished. I'd suggest you leave your car outside for a while and bring the ship home to work on it.

This has several advantages, biggest of which is monetary. It will take you several months to recondition a ship, working only evenings and weekends. The space your disassembled ship will occupy will probably cost you $25 a month at the airport. Hangar rent will always be your biggest source of expense.

When you pay for the aircraft, be sure the name of the seller agrees with that on the old registration certificate (Form 500) or the CAA will not issue one in your name. Four dollars must accompany it.

CAA regulations also require that, until you get your A&E tickets, your work must be under the direct supervision of a licensed mechanic. Before your ship may be returned to service, your application for airworthiness (CAA Form 305) must be completed, and the aircraft inspected by a representative of the CAA (DAMI). His fee is at least $10. But first the ship must be certified as airworthy by your A&E, both in the logs and on CAA Form 319. If there has been a major repair or alteration, CAA Form 337 must be made out in addition. Since no mechanic in his right mind is going to sign off anything he hasn't inspected, your work will, in fact, have been under his supervision. You must get checked out periodically as the work progresses. It's *your* neck.

I don't want to give you the idea this whole thing is a pushover. It's a big job. But it can be fun if you don't have to meet a deadline. There may come times when you'll feel like chucking the project. If you've got the plane at home you can do just that, for as long as you want—without the expenses running up. Set it aside and give yourself a rest 'til you feel like going at it again. It's impossible to say how long it will take you, but I can promise you this—the day you tow it back out to the field and hang the wings on it, you'll experience a satisfaction no rich kid ever got from a new one. As ever,

Ray

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JULY 1954 FLYING INDEX

Aero Publishers, Inc. 58
Aircraft Owners and Pilots Association 53
Air Associates, Inc. ..... Fourth Cover
American Airlines, Inc. 13
American Flyers, Inc. 58
American Mercury Insurance Co. 52
Batori Computer Company, Inc. 62
Cal-Aero Technical Institute 50
Cessna Aircraft Company 55
Convair 45
Continental Aviation & Engineering Corp. 10
Cramer Aircraft Service 62
Criterion Co. 61
Embry-Riddle School of Aviation ..... Second Cover
Esso Aviation Products 49
Flying Magazine Book Service 59
Gaare Supply Co. 61
Goodyear Aviation Products 3
Gulf Oil Corporation 5
John W. Hobbs Corporation 65
Indiana Technical College 62
E. H. S. Jurgens 62
Kane Aero Equipment Company 64
Liberty Aircraft Company 61
Lockheed Aircraft Corporation ..... 6 and 7
Met-Co-Aire 57
Meyers Aircraft Co. 62
Munk Aero. Lab., Inc. 61
Navco, Inc. 64
Newburgh Seaplane Base 51
Northrop Aeronautical Institute 46
Pacific Airmotive Corporation 47
Pan American Navigation Service 60
Parks College of St. Louis University 56
Piper Aircraft Corporation 9
Powers & George 63
Remmert-Werner, Inc. 64
Soaring Magazine 60
Spartan School of Aeronautics 61
Standard Oil Company of California 11
St. Louis Machine Co. 48
Trans World Airlines ..... Third Cover
Weems System of Navigation 56
Jim Welsch Aircraft Sales 63
William C. Wold Associates 63
Ziff-Davis Publishing Company 51

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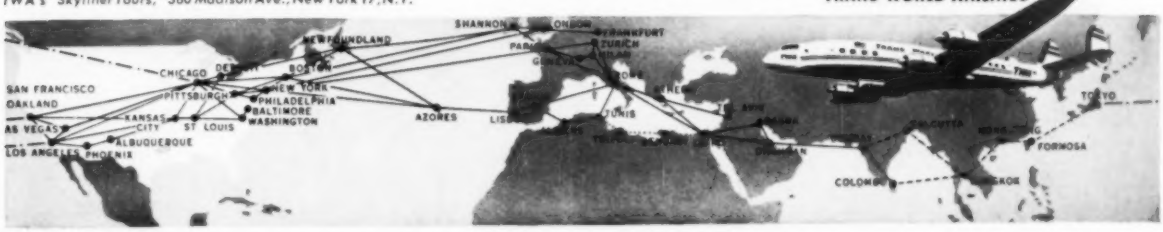

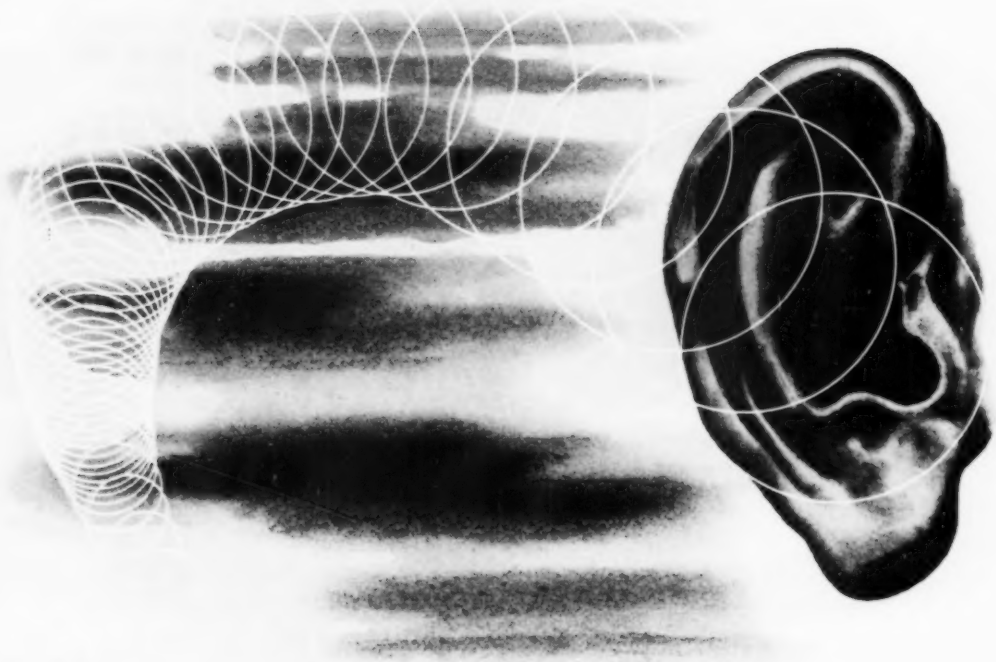

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